

DOCUMENT RESUME

ED 388 485

RC 020 334

AUTHOR Knapp, Clifford E.
TITLE Just beyond the Classroom: Community Adventures for Interdisciplinary Learning.
INSTITUTION ERIC Clearinghouse on Rural Education and Small Schools, Charleston, WV.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO ISBN-1-880785-15-3
PUB DATE 96
CONTRACT RR93002012
NOTE 115p.
AVAILABLE FROM ERIC/CRESS, P.O. Box 1348, Charleston, WV 25325-1348 (\$12).
PUB TYPE Books (010) -- Information Analyses - ERIC Clearinghouse Products (071) -- Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Active Learning; *Class Activities; *Community Study; Democratic Values; Educational Change; *Experiential Learning; Field Trips; *Interdisciplinary Approach; Intermediate Grades; Junior High Schools; Learning Activities; Learning Strategies; *Outdoor Education; Problem Solving; *Student Centered Curriculum
IDENTIFIERS *Problem Based Learning

ABSTRACT

Outdoor education, a general term describing the use of resources outside the classroom, has long been considered a method to improve student learning. This book aims to create a bridge between current school reform efforts and the field of outdoor education. Chapter 1 introduces the idea of outdoor education and relates several recent educational innovations to principles of outdoor education and experiential learning. These innovations include service learning, children's museums, constructivism, problem-based learning, technology-based authentic learning, concern for multiple intelligences, and interdisciplinary learning. Chapter 2 makes suggestions for planning outdoor learning, explains the role of the teacher in student-centered learning, and outlines a learning adventure model. Chapter 3 presents 12 outdoor adventures that move instruction into the community. Developed for grades 4-9, these adventures can be adapted to most ages or to nonschool situations or can be a model for teachers to develop their own thematic units. Each adventure contains an organizing problem, background, outcomes, activities, reflection questions, and performance assessments. Themes include observing people at the shopping center, community planning, local pollution problems, starting a democratic society, homesteading, seeing a city block, fast-food fact finding, scouting the school grounds, reading the cemetery "story," down the drain, nature in the city, and creating a nature trail. Appendices contain a brief history of outdoor education and experiential learning, an environmental inventory, bibliographies of related materials, guidelines for creating student-centered learning communities, related organizations, and 15 ways to study a place without a guide. Contains 44 references. (SV)

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CLIFFORD E. KNUDD

Just Beyond the Classroom

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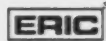


JUST BEYOND THE CLASSROOM:
COMMUNITY ADVENTURES FOR
INTERDISCIPLINARY LEARNING

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ISBN 1-880785-15-3

Illustrations by John MacDonald, Williamstown, MA
Cover design by Richard Hendel, Chapel Hill, NC

Library of Congress Cataloging-in-Publication Data

Knapp, Clifford.

Just beyond the classroom : community adventures for
interdisciplinary learning / Clifford E. Knapp.

p. Cm.

Includes bibliographical references (p. 107)

ISBN 1-880785-15-3

1. Outdoor education--United States. 2. Interdisciplinary
approach in education--United States. 3. Problem-based
learning--United States. 4. Community and school--United
States. I. Title

LB1047.K573 1996

371.3'8--dc20

95-45575

CIP

This publication was prepared with funding from the U.S. Department of Education, Office of Educational Research and Improvement, under contract no. RR93002012. The opinions expressed herein do not necessarily reflect the positions or policies of the Office of Educational Research and Improvement or the Department of Education.

The ERIC Clearinghouse on Rural Education and Small Schools is operated by the Appalachia Educational Laboratory (AEL), Inc. AEL is an Affirmative Action/Equal Opportunity Employer.

—To my grandchildren,
Cindy, Eric, Shannon, and Shawn, and others
of their generation.

Table of Contents

Preface	ix
Acknowledgments	xi
Chapter 1. Educational Reform and Outdoor Education ..	1
Chapter 2. Planning for Outdoor Learning	19
Chapter 3. Twelve Outdoor Adventure Themes	29
No. 1 Watching and Talking to People at the Shopping Center	34
No. 2 Community Planning	38
No. 3 Local Pollution Problems	41
No. 4 Homesteading the Land	44
No. 5 Starting a Democratic Society	47
No. 6 Seeing a City Block	50
No. 7 Fast-Food Fact Finding	53
No. 8 Scouting the School Grounds	57
No. 9 Reading the Cemetery Story	60
No. 10 Down the Drain	64
No. 11 Nature in the City	67
No. 12 Designing and Constructing a Nature Trail	71
More Organizing Problems to Investigate	75
Appendices	
A. A Brief History of Outdoor Education and Experiential Learning	77
B. Environmental Inventories	83
C. Children's Literature Springboards to Outdoor Adventures	87
D. Selected Readings in Community Adventures and Interdisciplinary Learning	89
E. Annotated Bibliography of Books on Student-Centered, Outdoor Learning	91
F. Guidelines for Creating Student-Centered Learning Communities	95
G. Organizations and Programs	99
H. Fifteen Ways to Study a Place Without a Guide	101
References	103
About the Author	107

Preface

Teachers, administrators, and policy makers are striving to unify a fragmented curriculum, foster teaching methods which engage students as active participants in the learning process, and respond to the needs of at-risk students. These efforts call for experiential educators to enter the national discourse on educational reform.

(Westheimer, Kahne, & Gerstein, 1992, p. 48)

School reform is a controversial topic. Educational leaders have different ideas about how to improve schools by modifying instructional methods, reorganizing the curriculum, or rethinking how experiences and subject matter content lead to meaningful learning. This monograph is about changing education by moving beyond the classroom to learn about the community and surrounding area.

Outdoor education, a general term describing the use of resources (including both natural and artificial environments) outside the classroom, has long been considered a method to improve student learning. The purpose of this book is to create a bridge between current school reform efforts and the field of outdoor education. The following pages are the planks on that bridge to help teachers move outdoors. The different approaches to achieving school reform are appropriate for teachers of all levels. The interdisciplinary activities in Chapter 3 have been designed for upper elementary, middle and junior high age students (grades 4-9), but could be modified by creative teachers for use with other students in school or nonschool settings.

In the early 1900s, outdoor education played a significant role in supporting mainstream education. During the progressive movement, outdoor educators and other like-minded educators worked hand in hand. Now, a resurgence of outdoor education and other experience-based methods of learning can once again help educators restructure schools.

Chapter 1 introduces the idea of outdoor education and describes several educational innovations and relates them to some principles of outdoor education. This summary of educational trends has been synthesized from recent issues of the Association for Supervision and Curriculum Development's (ASCD) *Update* newsletter and other sources. A list of 12 generalizations drawn from the selected reform efforts concludes the chapter.

Chapter 2 offers some suggestions about planning for outdoor learning. The role of the teacher in implementing student-centered learning is also explained. Based on recent research by curriculum specialists and psychologists, a learning adventure model is described.

Beginning with a brief introduction to interdisciplinary or integrated curriculums, Chapter 3 is a collection of 12 outdoor adventures that provides teachers with ideas for moving instruction into the community and surrounding area. These adventures can serve as models for teachers to develop their own thematic, interdisciplinary units.

Appendix A includes a more detailed history of outdoor education and describes several current programs that use the community outside the school. The appendices also include lists of useful references to help readers pursue the topics in more depth, as well as other practical and theoretical instructional support materials.

This book shows teachers how to restructure education through thematic and problem-based outdoor experiences. Exciting adventures begin with the first step outside the classroom. So, pack up and go outdoors!

Acknowledgments

We are all like sponges soaking up the liquids of life experience. Some liquids evaporate and we forget. Others stay with us and we remember. When we are asked to share experiences with others, we can squeeze out some of what we have retained for others to absorb, if they are ready and willing.

This book is dedicated to my grandchildren—Cindy, Eric, Shannon, and Shawn—and others of their generation. They and their teachers are the ones who can benefit from moving beyond the classroom to soak up knowledge through direct experiences. I thank all those who have helped to saturate my experience sponge so that I could share what I've learned with the world's future leaders and their teachers.

I would also like to credit my colleagues and our students at the Lorado Taft Field Campus for helping to provide a climate for experimenting with and exploring ideas for outdoor learning. Especially helpful in preparing and editing this monograph were Jan Woodhouse and Patricia Cahape Hammer. Good editors always help authors appear to be better writers than they actually are. This is the case with their help in preparing this manuscript. I would also like to thank my typist, Judith Young, for her work in transforming my ideas to words on the printed page.

CHAPTER 1



Educational Reform and Outdoor Education

The symbols don't render the experience, they suggest it. If you haven't had the experience, how can you know what it is? Try to explain the joy of skiing to somebody living in the tropics who has never seen snow. There has to be an experience to catch the message, some clue—otherwise you're not hearing what is being said.

Joseph Campbell, The Power of Myth, p. 61

Although reforming education is a current topic, public schools have undergone continuous evaluation and change since their inception. Very few of the current reform efforts are really new. Many of them have been tried before, but were abandoned. Because modern public schooling is so complex and diverse, and educators and the general public have such varied viewpoints about what is wrong and what should be done to correct the problems, school reform is likely to continue as an ongoing process.

Ann Lieberman attempted to summarize the goal of school reform: "What everyone appears to want for students [is] a wide array of learning opportunities that engage students in experiencing, creating, and solving real problems, using their own experiences, and working with others . . ." (April, 1995, p. 591). That is the same goal outdoor educators strive for by taking students beyond the classroom.

Since the 1930s, the term *outdoor education* has described learning conducted beyond the confines of the traditional classroom to meet educational objectives. (See Appendix A for a brief history of outdoor education.) Even though this simple definition, based on physical location, is meaningful to most people, more detail is necessary to fully develop the idea. Outdoor education involves more than just moving the students outside under the shade of a tree to read a story. Although the air may be cooler and the change of scene welcomed, the decision to move outdoors should be based on other valid learning principles.

Outdoor education also involves a particular method of teaching. This method is best described as experiential learning, and it consists of four distinct segments: (a) active student involvement in a meaningful and challenging experience, (b) reflection upon the experience individually and in a group, (c) the development of new knowledge about the world, and (d) application of this knowledge to a new situation (where the cycle can begin again). Although there are several models of experienced-based learning (see Knapp, 1992a, pp. 36-37), this basic four-step sequence exists in all of them.

To use the experience-based instructional method beyond the classroom, a teacher needs to do more than just go outside with students. In the story-reading example above, if the teacher decided to shift the students' location from the classroom to the shade of a tree because the story was about a tree, we would be approaching a more complete meaning of the term *outdoor education*. To take this example one step closer to achieving the experience-based learning model, the students would also need to touch, smell, hear, and maybe even taste part of the tree and discuss what they had learned. The students would also have to view the activity as interesting to them in order for the learning to be meaningful and retained over time.

Outdoor education has also been defined by the content (objects and events) studied. Some activities such as investigating a cemetery, paddling a canoe, or measuring an acre cannot be learned through direct experience in a classroom. It is generally agreed that outdoor education includes the study of both the *natural* and *artificial* (human-made) environments. This means

that outdoor education can begin with the first step outside the school building.

Teachers who fully understand the theory and practice of outdoor education strive to create learning environments beyond the classroom that provide students with firsthand experiences in the context of "real world" situations whenever feasible. They attempt to present objects and events directly, rather than by only mediating them through words or other symbols and instructional technology. Although there is nothing inherently wrong with using mediated experience in certain instances (e.g., video scenes of a volcanic eruption), an accomplished outdoor educator strives to balance methods of instruction by providing direct experiences as well as mediated ones.

Many current innovations in education include a strong element of experience-based learning. In this chapter, we will review the relationship between outdoor education and some current learning theories and programs receiving attention in the education press. The following summaries have been condensed from recent issues of *ASCD Education Update* (formerly *ASCD Update*, published by the Association for Supervision and Curriculum Development) and other sources. We will examine service learning, children's museums, constructivism, problem-based learning, technology and authentic learning, cooperative learning, the theory of multiple intelligences, and interdisciplinary learning.

Service Learning

In well-designed service learning programs, students do more than ladle out soup to the homeless or pick up trash in public parks, experts say. They apply what they've learned in the classroom, develop leadership and communication skills, become more caring and responsible citizens—and help meet community needs in the process. (Willis, 1993, August, p. 4)

Service learning involves helping others while, at the same time, helping the students. There must be mutual benefits to both the students and the wider community. The locations for service learning vary considerably. Students work in hospitals, soup

kitchens, homeless shelters, day care centers, or any other place in which service is needed and welcomed. The types of service also vary. Students may be involved in recycling, monitoring air and water quality, cleaning up pollution, planting bulbs in parks, supervising recreation, tutoring other students, checking blood pressures, or raising money for charities.

Service learning emerged shortly after World War I, resurfaced in the 1950s and again in the 1970s, when another wave of school-based service projects attempted to link students more closely to community activities (Conrad & Hedin, 1991, p. 744). Conrad and Hedin reported that both quantitative and qualitative research supports the value of community service and other experiential approaches. Their summary of recent quantitative research revealed benefits to the intellectual and social-psychological development of participants.

Researchers consistently report a heightened sense of personal and social responsibility, more positive attitudes toward adults and others, more active exploration of careers, enhanced self-esteem, growth in moral and ego development, more complex patterns of thought, and greater mastery of skills and content that are directly related to the experiences of participants. Furthermore, when the impact of service on others has been examined, young people have proven to be effective in raising mathematics and reading scores and in reducing drug use among peers. (1991, p. 747)

In summarizing the quantitative and qualitative research results, Conrad and Hedin recommended that practitioners and policy makers give service learning serious consideration.

In service learning programs, the reflection phase of experiential learning is very important. This can be accomplished through journals, discussions, or essays. In discussions—called *reflection sessions* by outdoor educators—students apply higher order thinking skills, while teachers encounter many unplanned, “teachable moments,” in which they are able to help students connect their experience to curriculum objectives.

Research has shown that many students learn especially well through hands-on activities that they view as important. Service

projects often begin with important questions, such as "How did the stream get polluted?" or "Who pays for cleaning up the pollution?" or "How can we develop good public policy on pollution?"

Service learning fits well with recent thematic or interdisciplinary approaches to curriculum (described below). For example, through the study of the theme, "Hunger In Our Community," the following questions could be investigated:

- What are some local nutrition standards? (*biology*)
- To what extent does hunger exist in our community? (*social studies*)
- How have hunger issues been reflected in the literature? (*English*)

The service activities resulting from answering these questions could help students connect with the community, help alleviate the local hunger problem, and provide deeper meaning to academic learning.

A fundamental principle of learning is that acquiring knowledge involves a meaningful interaction between what we already know and what we want to learn. Outdoor education provides students with common life experiences on which to build new knowledge. Students, who prefer to learn through concrete experiences and sensory exploration, thrive in service learning situations.

Children's Museums

The rich resource represented by children's museums has drawn the notice of some enthusiastic educators. (O'Neil, 1994, February, p. 4)

One of the leading proponents of children's museums as a model and resource for schools is John Gardner of Harvard University. He believes that schools can promote deeper understanding of academic content if the curriculum is developed using principles of museum exhibit design. Some valuable principles

of children's museum design include the opportunity and freedom of students to

- approach exhibits that interest them,
- explore objects in a hands-on manner, and
- discuss what has been experienced and observed with others.

Gardner contends that schools and children's museums can benefit each other from closer communication and joint projects.

Sometimes outdoor educators ignore the importance of following the interests of students when they plan outdoor activities. However, students' control of their learning is another factor affecting knowledge acquisition. When students feel ownership, they are more positive about the experience. Many museum activities provide for student choices in accomplishing hands-on tasks, capitalize on student interests, and lead to social interaction and group discussion. Outdoor educators have long realized that student attitudes and perceptions play an important role in the learning process. Simply leaving the confines of classrooms to learn something students consider meaningful can improve students' views of the overall curriculum.

Constructivism

The new banner is constructivism, another theory about learning, which emphasizes the importance of the learner's active construction of knowledge and the interplay between new knowledge and the learner's prior knowledge. (O'Neil, 1992, March, p. 1)

Cognitive researchers and curriculum specialists believe that implementing a constructivist approach to learning will lead to deeper understanding (the ability to apply knowledge in new situations) and retention of knowledge. One characteristic of the constructivist approach is embedding information and skill development into the context of an authentic problem.

The key tenet of constructivist theory . . . is that people learn by actively constructing knowledge, weighing new information against their previous understanding, thinking about and working

through discrepancies (on their own and with others), and coming to a new understanding. (O'Neil, 1992, March, p. 4)

In classes where these tenets are honored, students have many opportunities to explore ideas, reflect, share hypotheses with others, and revise their thinking. Teachers need to consider the prior conceptions and misconceptions that learners hold about the topic of the lesson. Misconceptions are difficult to change and, therefore, paying attention to the learners' current conceptual understanding is important. The students' experiences and prior knowledge are considered keys to learning. There is still a place for memorizing basic facts, practicing discrete skills out of context, or listening to lectures, but these ways of learning should be minimized according to constructivists.

In order to learn declarative knowledge (concepts and facts), people need to construct meaning, organize it, and then store it. Instead of using only symbols such as words, diagrams, or models, outdoor education exposes learners to real situations to serve as mental organizers. Elaboration, a technique for storing declarative knowledge, involves linking new information to old through memorization. One way to memorize materials is to create mental pictures, physical sensations, and emotions associated with the information. Direct experiences with objects and events help learners remember the images associated with the information and, therefore, aid in storing it for later use.

In order to learn procedural knowledge (skills or processes) students must (1) construct models [by learning a series of steps to perform or rules to follow], (2) shape the knowledge [understanding gained through trial and error or experimentation], and (3) internalize the knowledge [performing the skill with relative ease]. For example, learning to operate a car by actually driving one or learning to build a campfire by actually making one are ideal ways to acquire procedural knowledge. We eventually gain skills by automatically performing the procedures without applying much conscious thought. Outdoor education provides many opportunities for students to gain specific procedural knowledge by orienteering, predicting weather, seining a river, learning local history at a cemetery, or writing a nature-based Haiku poem outside.

Even before cognitive researchers developed the idea of constructivism, outdoor educators intuitively practiced many of its components. For example, outdoor educators traditionally (a) value the active experience more than the passive lecture, (b) employ Socratic questioning techniques to foster discovery learning, (c) value natural contexts and direct experience in the learning process, and (d) advocate Dewey's learn-by-doing approach. Now with access to the research of the cognitive psychologists, outdoor educators can strengthen their educational philosophies with an up-to-date theory labeled *constructivism* without sacrificing their time-tested principles.

Putting constructivist strategies into practice isn't easy. It takes time to decide on the central organizing concepts of lessons and to guide the active involvement of learners. Also, certain organizational patterns of the school, such as standardized testing and relatively short time periods devoted to separate subjects, can create barriers to implementation. Nevertheless, several recent educational innovations incorporate constructivist principles. The whole language movement in English, the curriculum standards developed by the National Council of Teachers of Mathematics, and the recommendations on effective science practices issued by the National Center for Improving Science Education all reflect constructivism. (O'Neil, March, 1992, p. 4)

Problem-Based Learning

In a nutshell, problem-based learning organizes the curriculum around a series of ill-structured problems that students work on for weeks or even months. . . . These carefully crafted problems usually require students to use knowledge and skills from several disciplines. . . . (O'Neil, 1992, August, p. 1)

Problem-based learning was developed, in part, as a reaction to unproductive educational practice, including curriculums organized by disciplines and instruction focused on superficially "covering" many topics and skills to students assuming passive roles. Developers recognized that, after the written test, much of this material was forgotten because it was rarely used again. Problem-based learning helps to remedy these shortcomings by

focusing learning on problem solving that supports critical thinking, analysis, and decision making. Teachers guide the process by helping students (1) identify what they already know about the elements of a problem and (2) organize related questions and ways to find answers to them. They don't tell the students how to solve the problem. Questions used to initiate problem-based learning could include these examples:

What lives in that den?

How did the pioneers dye cloth?

How big is an acre?

How did Native Americans start fires?

After the problem is resolved to the satisfaction of all, the teacher conducts a performance assessment to monitor what was learned.

There are several advantages to organizing learning around problems rather than around disciplines. One value to students is that they are encouraged to view issues from multiple perspectives, just as the larger community does. Another is that academic work is clearly linked to the world outside the school. In addition, problem solving is a lifelong endeavor that has many immediate and practical applications.

There are some obvious difficulties in implementing this approach, however. Some skeptics don't want to sacrifice the broader "coverage" of the traditional discipline approaches. Other critics point to the inability of some teachers to play the role of "cognitive coaches." Because initial successes have been with gifted students, some educators wonder if all students will respond positively. But some studies show that students in problem-based courses learned as much factual content as those in a traditionally organized class. Equally important, many students are enthusiastic about problem-based learning and want to do more.

Outdoor activities can provide many opportunities for students to practice skills such as decision making, investigating, inquiring, problem solving, and inventing. In Chapter 3, 12 sets of questions are posed with related sets of activities.

Technology and Authentic Learning

Technology, some experts say, can contribute substantially to the active, experiential learning that Dewey advocated decades ago. In fact, some new and emerging technologies are rendering more permeable the four walls of the classroom, allowing students to take part in activities and projects that blur the distinction between learning in school and in the real world. (O'Neil, 1993, October, p. 1)

Recent cognitive research has shown that most students learn better by solving real-life problems, compared with completing drills on decontextualized bits of information. Because of this, schools have begun supporting *authentic learning*—new catchwords for *learning by doing*.

According to Krovetz and colleagues, students were involved in authentic learning if they were able to

1. articulate the purpose of activity;
2. analyze and practice what they *do* know;
3. acknowledge what they *do not* know;
4. formulate questions that lead to further knowledge;
5. synthesize connections between knowledge and life experience now and in the future; and
6. evaluate what was learned, how it was learned, and how it could be more effectively learned as a formal part of the assignment. (Krovetz, et al., 1993, p. 73)

Newmann and Wehlage (1993, p. 8) defined authentic learning using three criteria:

1. students construct meaning and produce knowledge;
2. students use disciplined inquiry to construct meaning; and
3. students aim their work toward production of discourse, products, and performances that have value or meaning beyond success in school.

Some technologies can help students explore their communities and share with others more easily. For example, students can

present reports using computer-generated text and graphics. They can create videos or sound recordings to report the results of fieldwork. The power of telecommunications can be employed to gather up-to-date information about a topic under study. It can also facilitate cooperative, distance learning to share important findings gathered by teams of students separated by geography. "Experts agree that the process of creating more authentic and engaging curriculums must accompany the process of integrating the latest technological developments in schools" (O'Neil, October, 1993, p. 5). However, the inherent danger in using educational technology is that it will not be used effectively as a tool to enhance meaningful learning. If using technology results in students passively receiving information organized by others and spending long hours isolated in front of a computer screen, its value will be limited.

Outdoor and environmental educators have begun to use technology to support data gathering and sharing that result from field-based projects. Notable examples of such programs include students writing about rivers and people living along rivers and sharing water quality data with others who have gathered similar information. Some examples of projects that employ technology in authentic learning beyond the classroom are GREEN (Global Rivers Environmental Education Network), Ground Truth Studies Project, the GLOBE (Global Learning and Observations to Benefit the Environment) program, and Earth Force (Charles, 1994, pp. 9-11). (Interested readers will find contact information for these groups in Appendix G.)

Cooperative Learning

Cooperative learning is usually defined as students working together in groups . . . with group goals but individual accountability. Advocates of the technique say it improves students' academic achievement and social skills, helps students from different backgrounds become friends, and smooths the mainstreaming of students with disabilities. (Willis, 1992, March, p. 1)

After more than a decade of popularity, cooperative learning strategies are still being used effectively. Some leaders in the

field estimate that cooperative learning is spreading and now reaches about 10 percent of the teachers in the United States. Other leaders cite a heavy demand for teacher training in the theory and techniques of cooperative learning.

By transferring more of the responsibility for learning directly to the students, teachers can concentrate on helping students with problem solving, decision making, and other higher-order thinking skills. The benefits of cooperative learning stretch beyond the students. Advocates point to the value of learning to cooperate in order to function better in the business world. Some experts say that when several teachers in a school use cooperative techniques in class, the overall school climate improves.

Outdoor educators have long used small, cooperative groups to increase student involvement in outdoor lessons. In the early days of decentralized school camping, students lived together in small groups and planned almost all of their programs. Even today in many outdoor education centers, activity groups are small to maximize learning. Group initiative challenges—activities designed to teach communication and cooperation—are an integral and popular part of many resident outdoor education programs.

Multiple Intelligences Theory

Gardner [in his book, *Frames of Mind*] argued that our traditional conception of intelligence—as primarily linguistic and logical abilities—is too narrow, and that all human beings actually have seven distinct intelligences. . . . Some educators who find Gardner's theory intuitively appealing are working to address all seven intelligences in their classrooms. (Willis, 1994, October, p. 1)

Multiple intelligences theory outlines seven ways of recognizing a person's intellect. Thomas Armstrong, in *Multiple Intelligences in the Classroom* (1994), describes them this way:

Spatial. This is the ability to perceive the visual-spatial world accurately and to perform transformations upon one's perceptions. This intelligence is highly developed in hunters, scouts, guides, interior designers, architects, artists, and inventors.

Bodily-Kinesthetic. This is expertise in using one's whole body to express ideas and feelings and facility in using one's hands to produce or transform things. This intelligence is highly developed in actors, mimes, athletes, dancers, craftspeople, sculptors, mechanics, and surgeons.

Musical. This is the capacity to perceive, discriminate, transform, and express musical forms. This intelligence is highly developed in musical performers, aficionados, and critics.

Linguistic. This is the capacity to use words effectively, either orally or in writing. This intelligence is highly developed in storytellers, orators, politicians, poets, playwrights, editors, and journalists.

Logical-Mathematical. This is the capacity to use numbers effectively and to reason well. This intelligence is highly developed in mathematicians, tax accountants, statisticians, scientists, computer programmers, and logicians.

Interpersonal. This is the ability to perceive and make distinctions in the moods, intentions, motivations, and feelings of other people. This intelligence can include sensitivity to facial expressions, voice, and gestures, as well as the ability to respond effectively to such cues—to influence other people, for example.

Intrapersonal. This is self-knowledge and the ability to act adaptively on the basis of that knowledge. This intelligence includes having an accurate picture of one's strengths and limitations, awareness of one's moods and motivations, and the capacity for self-discipline (pp. 2-3).

By applying this theory to instruction, some educators believe that students will become more well-rounded and motivated to learn. Gardner recognizes several possible ways to apply the theory in schools. One way is to identify students' strengths and to nurture them through specific lessons. Another is to identify weaknesses and help students strengthen them. A third way is to give equal emphasis to all seven intelligences in planning the curriculum. Gardner advises, "Don't treat everybody the same" (Willis, 1994, October, p. 5). One educator creates study centers

in the room and weaves all seven intelligences into each topic or theme. For example, in teaching about photosynthesis, his students read about the concept, draw diagrams, analyze the sequence of steps involved, dramatize the process, create a song, work in groups, and compare photosynthesis to a personal change in their lives. However, every learning activity does not have to involve all seven ways of knowing if they don't fit. Another way to use the theory is to encourage students to apply some of the intelligences to designing projects. When individual intelligences are acknowledged and honored, the students feel successful and their self-esteem is enhanced. It opens up other ways for students to show mastery of knowledge when used in selecting assessment techniques.

Caution should be exercised in labeling students according to their demonstrated intelligences. The fact that the intelligences can be expanded over time is reason enough not to track students according to their predominant abilities.

Gardner believes that the main value of his theory may be to help educators reflect on what teaching and learning are all about. Applying the theory of multiple intelligences encourages teachers to acknowledge differences in how students learn. Also, they must consider balancing the curriculum with content that allows for expression of different intelligences. Finally, they must design their instructional approaches to be compatible with the content of the curriculum.

Outdoor education has never been restricted to the *academic* (linguistic and logical-mathematical) intelligences alone. In fact, outdoor experiences often showcase intelligences that otherwise may not be apparent in traditional learning environments. How often we have heard teachers make statements like, "I saw a whole different side of Jennifer on the field trip."

Outdoor teachers have noted repeatedly that some students are able to excel when they learn outside through active (bodily-kinesthetic) experiences. Applying spatial skills, such as navigating with map and compass or tracking animals, has helped some students feel successful outdoors. Musical and interpersonal intelligences are often employed during a campfire program or recreational time. Intrapersonal skills can be reinforced through

solo experiences or other time alone outdoors to reflect, write, or think. Gardner's theory accommodates the social (interpersonal) benefits of resident outdoor programs in which students live and learn on a 24-hour basis. Effective outdoor educators have usually considered themselves generalists who take pride in being well-rounded in curricular and instructional matters. The theory of multiple intelligences can support outdoor educators, as well as inform and guide their future practice.

Interdisciplinary Teaching

In K-12 education, a field considered susceptible to fads, interdisciplinary teaching is notable for having held the interest of educators over time. After years of discussion and exploration, teachers remain attracted to the idea of integrating subject areas, for at least part of the school day . . . (Willis, 1994, December, p. 1)

Combining more than one discipline into a theme lesson is a growing trend, especially in the early grades. The idea has been accepted by many educators, but questions remain about when, to what degree, and how best to do it. According to Fogarty (Willis, 1994, December, p. 5), the appeal of interdisciplinary education is attributed to brain research on contextual learning, state and provincial mandates supporting this approach, the middle school movement and its emphasis on team teaching, and the popularity of whole language at the elementary level.

Thematic units give students opportunities to apply knowledge instead of simply memorizing and then forgetting information. Students also recognize that integrated curricular approaches help them understand the real-world need for subject matter and often increase their motivation to learn.

Several concerns have been raised about the approach, however. Some believe that less content is learned and, therefore, subject matter depth is lost. Others do not want one discipline to overshadow others. Another concern is that thematic units fail to focus on powerful ideas from the disciplines and, therefore, students may not appreciate the intricacies of the subjects. Despite these reservations, proponents acknowledge that interdisci-

plinary teaching can improve students' retention of the material. Advocates of this approach recommend that educators identify the standards established by state and national groups and make sure that the themes and topics address these performance benchmarks.

When teaching outdoors, it is difficult to restrict a lesson to a single topic. Disciplines are human inventions, and natural events are not neatly divided into separate areas. L. B. Sharp, an early leader in outdoor education, noted that discipline integration or grouping several subjects together was a popular educational trend in 1943 (1943, p. 362). Sharp told and retold one of his favorite stories about a group encountering a black snake that was in the process of swallowing a baby robin. In the group was an ornithologist and a herpetologist. The ornithologist argued for releasing the robin from the snake's grasp and the herpetologist argued to allow the snake to swallow the meal. Sharp's point was that, in the outdoors, the subject matter lines are not clearly drawn and that events like a snake swallowing a bird had to be viewed from an interdisciplinary perspective.

There is a current trend at elementary and middle school levels toward organizing curriculum around big ideas or themes. Some outdoor educators have organized activities in this way in planning units on Native Americans, European settlers, forest or river ecology, or exploring the local community. Using these themes, the activities usually span several curriculum areas. Researchers have shown that teaching via large cognitive structures promotes more learning than instruction organized around factual information (Marzano, 1992, p. 53).

Summary

The school restructuring efforts summarized in this chapter are far from complete. Many other topics have been described in other issues of *ASCD Update* and elsewhere over the past few years. Topics such as teaching thinking, total quality schools, inclusion, outcome-based student performance, character and values education, assessment rubrics, multicultural teaching, conflict resolution programs, and the use of portfolios in assessment are others that have captured educators' attention. These

topics are all important in the total education of students, but not as directly connected to outdoor education programs as those described above.

What generalizations can be drawn from this list of school reform innovations? The following ideas emerged:

1. Most students learn best when they assume an influential role in determining what to study and have choices in determining how they learn it.
2. Students create meanings from interactive experiences rather than have meanings imposed by adults through lectures disconnected from students' experiences and previous knowledge.
3. When knowledge is approached in thematic or problem-based formats, the connections between subject matter and life outside the school become clearer and students become more motivated to learn.
4. Knowledge retention is enhanced when students capitalize on their interests in the lessons and can apply what is learned in authentic contexts, both in and out of school.
5. Student projects, including those that provide needed services in the community, are useful ways to learn communication skills and build a community that values learning.
6. The boundaries between the school and the community are less distinct when students use locations such as businesses, parks, and governmental agencies as apprenticeship sites for learning relevant lessons.
7. The role of teachers is gradually changing to one more similar to a cognitive *coach* or facilitator rather than a dispenser of content.
8. If students have positive feelings associated with their learning, they are more likely to acquire additional knowledge about that topic in the future.
9. If decision making, problem solving, communication, and other skills necessary for responsible citizenship are taught

by applying them in democratic environments, they are more likely to be retained and used both in and out of school.

10. Lessons conducted in small, cooperative groups that maintain individual student accountability for what is learned are effective organizational structures for most students.
11. Group reflection sessions and performance-based assessment should be used to continuously evaluate educational outcomes.
12. In-depth, conceptual experience with knowledge and skills related to a few carefully chosen topics is better than superficial coverage of factual information related to many topics.

This list of 12 generalizations drawn from analyzing some recent school reform efforts is similar to many of those on the selected list of outdoor education principles developed by Rogers in 1956 and referred to in Appendix A. Cognitive psychologists and educational researchers have learned a great deal about the teaching and learning process during the past three decades. Teachers can use some of these findings as they plan learning activities that will continue to improve education as we move into the 21st century. The time has finally arrived for lessons conducted beyond the confines of the classroom to assume a more prominent place in changing schools. The challenge is ours.

CHAPTER 2



Planning for Outdoor Learning

Today our stores of information are so great that teaching of almost any informational materials, except by way of illustration, is wasteful. We no longer can educate our children by handing on to them a well-constructed parcel of the best that has been thought or said in the past.—Margaret Mead (in Metraux, 1979, p. 202)

The role of the teacher is very important in planning student-centered outdoor learning. In many ways it is more difficult to plan and execute lessons employing the experience method outdoors. One of the most common questions beginning teachers ask is, "Am I doing it right?" The *it* may mean service learning, using children's museums, applying constructivist theory to an outdoor lesson, integrating interdisciplinary outdoor learning, or any of the other educational reform innovations. Even experienced teachers, who attempt to expand their teaching styles and strategies, ask this same question when trying new instructional methods.

What is a *good* or *effective* teacher? This is a difficult question to answer briefly. Quality instruction is determined largely by examining the role of the teacher and what is valued in educational outcomes. Sergiovanni (1994) asks

Is a teacher an employee of the state, following the educational policies and practices dictated by the local, state, and federal

government? Or is a teacher a professional specialist whom a community employs to exercise his or her expertise on behalf of youngsters? Or is a teacher a spokesperson for tradition, passing on the riches of the culture? Or is a teacher a political engineer, leading youngsters to develop those skills necessary to reform their society? (p. 98)

Perhaps a good teacher performs all of these functions. Sergiovanni suggests that good teachers are

... opportunists who, within broad guidelines, embark on a journey whose happy ending is often hard to determine beforehand. They are concerned as much, if not more, about the quality of individual learning encounters (regardless of preset objectives) than they are about engineering learning encounters from preset objectives. (pp. 80-81)

Gardner (1991) describes the effective teacher as one who "functions as a 'student-curriculum broker,' ever vigilant for educational prosthetics—texts, films, software—that can help convey the relevant contents, in as engaging and effective a way as possible, to students who exhibit a characteristic learning mode" (p. 246). Educators who want to move beyond the classroom are, thus, brokers who help link students with the curriculum through structuring and guiding meaningful outdoor adventures.

Another way to define a good teacher is to describe effective learners and then evaluate teachers on the extent to which they promote effective student learning. Casey and Tucker (1994) define an effective learner as "a creative problem solver who is able to harness that creativity through organizational and planning skills" (p. 140). Based on the characteristics of creative problem solvers and effective planners, Casey and Tucker outline the teacher's role:

- posing open-ended problems,
- teaching the steps of thinking,
- incorporating problem solving into the curriculum,
- connecting lessons to student interest, and
- challenging and questioning.

Gardner (1991) believes that any concept or topic worth

teaching can be approached in at least five different ways that correlate with the seven intelligences (pp. 245-246). He explains this by using the metaphor of a room with five doors or entry points. He contends that students are different and therefore prefer to explore learning from different perspectives. For example, Gardner lists the five entry points to a lesson or unit of study on democracy:

1. narrational entry point—presenting a story or narrative about the topic (e.g., listening to or reading a story about the origins of constitutional government in the United States);
2. logical-quantitative entry point—invoking numerical considerations or deductive reasoning processes (e.g., examining congressional voting patterns over time or the arguments used for and against democracy by the founding fathers);
3. foundational entry point—examining the philosophical and terminological facets of the concept (e.g., pondering the relationship of democracy to other forms of decision making and government or investigating the root meaning of the word *democracy*);
4. esthetic entry point—examining sensory or surface features that appeal to students from an artistic point of view (e.g., listening to a string quartet [under the control of the group] versus an orchestra [under the control of a single conductor] and discussing the means and ends); and
5. experiential entry point—learning with a hands-on approach, dealing directly with the materials that convey the concept (e.g., forming decision-making groups and practicing democratic procedures).

The most obvious passage employed by outdoor educators is the experiential entry point. However, this doesn't mean that the other entry points couldn't be used, either as a preparation for outdoor lessons, as a technique for enhancing outdoor lessons, or as a way to follow up on the outdoor experience. For example, stories such as Byrd Baylor's *Everybody Needs a Rock*, *The Way to Start a Day*, and *Your Own Best Secret Place* (Baylor, 1974;

1979; and 1986) are excellent narrative entry points for outdoor adventures. (See Appendix C for other examples of children's literature springboards.) Questions such as "How would you prove that there are more than one million blades of grass in the school soccer field?" could be a logical-mathematical entry point for a school site investigation. Listening outdoors (an aesthetic entry point) could lead students to make a map of the locations of the various sounds. If the experiential learning cycle is followed, the adventure outside the classroom becomes the main stimulus for the learning that may follow in a variety of subjects.

Planning the Lessons

Designing instruction based on the experiential learning cycle necessitates a different type of planning from the "banking," "information-assimilation," or "chocolate box" models of teaching. In student-centered, experienced-based teaching, the planning process is more complex. Even when students are given an important role in selecting lesson purposes, activities, and ways to demonstrate achievement through their performances, prior planning by the teacher is still recommended. Preferably, a team of teachers can work together to design this instructional approach.

Sergiovanni (1994) lists a set of criteria developed by the Ontario Ministry of Education that teachers can use in selecting lesson content. Here is an excerpt:

Will it give children an opportunity for direct inquiry, independent study, and creative ability in the context of their own interests, abilities, and development needs?

Will it fulfill their needs to explore and to manipulate?

Will it capitalize on the use of all their senses?

Will it satisfy the children's search for pattern by building concepts that can be developed and related to other learning?

Will it relate to what the children already know?

Will it be sufficiently novel to stimulate questions, observations, and manipulations?

Will the children be able to see what they are learning as part of an organized and meaningful whole?

Will it spring from real experiences in the children's environment? Is it relevant to their understanding of the world? Is this content appropriate to each child's level of development?

With this content as a vehicle, will the children be able to know when they have been successful? Will it fulfill the children's basic needs for mastery?

Will it provoke questions, involvement, and a desire for further exploration?

Will it utilize all the channels of learning—visual, auditory, motor-manipulative, olfactory, gustatory, and tactile?

Will it encourage learning through play?

Will this content provide opportunities for various techniques of investigation? (pp. 107-108)

Sergiovanni (1994, p. 109) also describes three types of educational outcomes from the work of Elliot Eisner: (1) In traditional approaches instructional outcomes are set in advance and are usually stated specifically in terms of the student behaviors to be expected at the end of the lesson or series of lessons. The lessons are designed using these outcomes as starting points. (2) Problem-solving outcomes are shaped by the decisions made about the problems selected and the solutions generated by exploring them. (3) Expressive outcomes are discovered during and after the teaching of tried-and-true subject matter or time-tested activities rather than set in advance. Experienced teachers sometimes begin lessons based on favorite books or field trips that always seem to stimulate student involvement and result in learning (expressive outcomes). These are the activities they know that work. According to Eisner's model, the key to planning successful lessons is to achieve a balance among instructional, problem-solving, and expressive outcomes.

Planning for outdoor teaching is similar to preparing to teach indoors in some respects. Teachers must plan for meeting mandated goals and objectives, managing logistics and space

(site selection), involving students through various activities, and reflecting on and assessing what is learned and how it can apply to the future.

Provision must also be made for safety and to care for the basic needs of students. Very little learning occurs when the feet are cold, the bladder is full, or the throat is parched.

Goals and objectives. There are usually more distractions outside the confines of the school. The teacher and students must know why they are leaving the classroom. When goals are unclear or casually conveyed to students, what they will learn is likely to be affected. The teacher and students should be confident that a particular field trip or school site activity is the very best way to achieve the objectives. Otherwise, why do it? Determine the reasons for going outdoors and then build enthusiasm for doing it and prepare the students to benefit from the direct experiences.

Logistics. Outdoor lessons should be planned carefully and should include contingency plans for anything that might happen, including accidents, inclement weather, undependable transportation, or failure of resource people to perform or appear. When planning, teachers should communicate with all involved.

Here are some suggestions for preparing for the outdoor lesson:

1. Take care of administrative details early. Get approvals from administrators, arrange transportation, and get permission forms long before the day of the trip.
2. Make a dry-run site visit and meet with the guide or host at the site to discuss the purposes, student ages and backgrounds, what the students know or can do, and the various problems that may arise.
3. Check details and determine what will be needed, such as special materials or apparatus, food, drink, expense money, and first aid. Sometimes provide learning sheets for data gathering and problem solving. These guide sheets help students focus on what is important and provide for learning

accountability later on. Provide writing boards, pencils, field guides, and other needed equipment, if appropriate. If only a few compasses can be located, don't try to involve the whole class at once.

4. Arrange for adequate supervision. The number of supervisory personnel will vary according to the planned activities, conditions at the site, and the age and number of students. More supervision is usually better than less. Other adult supervisors may include administrators, parents, college students, and resource people. Teachers need to communicate the schedule to them, including what goals to accomplish and precisely what each supervisor should do. Many teachers conduct on-site training sessions for the adults who will accompany them on the field trip, and provide pre-trip orientation sessions for parents. When extra adults are along, make sure they know their responsibilities, especially about special students needing extra guidance and supervision.
5. Develop the plans very carefully and anticipate possible student needs. (One experienced outdoor teacher stated that each time he goes outside, he plans more thoroughly than the time before.)
6. Communicate expected behavior and develop guidelines with the students in regard to other people. Students must know (a) the reasons you are looking forward to the trip, (b) the purposes for going, (c) the job or responsibility of each person, and (d) the expectations about student behavior. Students need to participate in this process in order to feel ownership of a code of behavior and of their activities.
7. If the excursion involves transportation by bus, train, or other means, some teachers create a mile-by-mile itinerary—complete with questions to answer by observing along the route. Students can note landforms, mining operations, signs, buildings, plant and animal life, and other significant landmarks along the way.

8. When organizing students for field instruction, many teachers use cooperative, small groups or teams whenever possible—each with clearly defined roles and tasks to perform. The team approach allows the students to work on one aspect of the problem and later to pool their results. They should work cooperatively to take notes, measure objects, or help each other with needed tasks. It's much easier to keep track of six teams of five than of 30 students working individually.

Site selection. Ideally, a variety of appropriate sites are available for meeting particular objectives or solving certain problems. The site should contain the needed instructional resources, be within a reasonable travel distance, and be safe and accessible for use by all.

Key procedures in the evaluation and selection of a site include:

1. Determine if the site is accessible. Is it owned by the school or can permission be obtained from the owner?
2. Determine the distance from the school. Is it within a reasonable distance for the amount of time available? Do traffic routes and parking create problems?
3. Examine the site to know what is there and what lessons are possible. What are the hazards and potential dangers? Record them and call them to the students' attention.

Concentrate on outdoor areas as close to the school as possible to save transportation time and expense. While these may not be the most unique sites available, don't overlook the school grounds, parks, and other areas within walking distance. They offer many possibilities for outdoor lessons.

Direct involvement. Taking students outside is no guarantee that experiential learning will take place. These learning adventures should include the following elements:

1. Opportunity for each student to interact with the environment in a relaxed atmosphere. Design the experience to allow plenty of time to explore the site and to allow for those unplanned, teachable moments that often arise.

2. Opportunity for open-ended inquiry and discovery. Let the experience be the teacher, too. Let the experience stimulate questions. All questions don't have to be answered on site—that can be a follow-up activity back in the classroom.
3. Opportunity to engage in activities that make a minimal impact on the earth. Environmental ethics should be considered when designing the activities. Behaviors such as measuring, counting, sketching, and describing are preferable to using more damaging practices such as digging, chipping, and collecting. Create a code of environmental ethics that reflects care and respect for the earth.

Reflection. This is a crucial aspect of outdoor instruction. To learn from experience, we must take the time to sort the relevant from the irrelevant—the useful from the useless. After an experience, students can identify the important elements by asking, “What was significant to me?” Then they can analyze these elements in greater depth, considering both thinking and feeling levels. They can ask, “Why was this helpful or not helpful?” or “What did I feel when this happened?” Finally, they can generalize their thoughts and feelings in order to plan for the future. They can ask, “How will this be useful later?” or “When can this be applied to solve a similar problem?” According to John Dewey (1938/1963),

The method of intelligence manifested in the experimental method demands keeping track of ideas, activities, and observed consequences. Keeping track is a matter of reflective review and summarizing, in which there is both discrimination and record of the significant features of a developing experience. To reflect is to look back over what has been done so as to extract the net meanings which are the capital stock for intelligent dealing with further experiences. It is the heart of intellectual organization and of the disciplined mind. (p. 87)

Assessment. Teachers should see a clear relationship between what is done outdoors and the follow-up activities afterwards. Back in the classroom, encourage students to (a) seek answers to some of the problems they encountered; (b) develop programs to inform parents and others about what was learned; (c) develop

reports, projects, and demonstrations based on the trip; and (d) communicate thanks to the resource people and other helpers. Authentic assessment can take place by planning real-world activities that demonstrate whether or not the goals and objectives have been met. There are many alternative assessment activities to supplement traditional pencil-and-paper tests. Performance assessments can also take place outdoors. Involve students in the assessment of the activity and obtain their recommendations concerning future trips and other problems to investigate.

Summary

Classroom teachers are the keys to conducting successful outdoor education adventures. Once they leave the classroom to learn with their students, teachers assume added responsibilities and challenges. They are the brokers or intermediaries who help students connect outdoor experiences with the basic knowledge needed to live productive and meaningful lives. By using various entry points to outdoor lessons, especially direct experiences, teachers can open new worlds to students by linking the school more closely with the wider community.

CHAPTER 3



Twelve Outdoor Adventure Themes

Students must leave school with the passion to question, without the fear of looking foolish, and with the knowledge to learn where and how the facts can be found. (Grant Wiggins, 1989)

The outdoor "lesson ideas" or models presented in this chapter are not intended as prescriptions for the one best way to teach. The following adventures might be more accurately viewed as menus consisting of appetizers, beverages, entrees, and desserts. Another way to view them is as travel itineraries listing possible trips to take. Teachers and other curriculum planners are expected to choose from the various courses of the meal or destinations on the itinerary. When the students enter the planning picture, the lesson adventure often changes direction. As students gain more knowledge, new problems, issues, concerns, and questions may arise to redirect the activities or even the projected outcomes. If a teacher is new to thematic, interdisciplinary teaching, he or she may want to follow many of the suggestions offered in the models. As teachers gain more experience, they will see many opportunities to develop their own adventures based on curriculum mandates, the needs and interests of the students, and their localities.

Each of the adventures consists of the following sections: Theme, organizing problem(s), background, possible outcomes, possible activities (labeled with the main subjects to be learned),

reflection questions, and performance assessments. Other information usually associated with lesson or unit plans (suggested grade level; time span of the study; specific concepts, skills, and attitudes; materials needed; resource books for each theme; and other details) are not provided for each adventure. However, the appendices will be helpful in this regard. Teachers are better prepared to make these decisions in the context of their instructional settings. Each adventure is an invitation to explore a topic in suitable environments beyond the school building.

According to Panaritis, school reform literature advocates that "before adopting an innovation, teachers must be able to create personal 'action images' or mental pictures of the specific things they would do to implement the idea" (1995, p. 626). What would the action image or mental picture be like for teaching a student-centered, theme-based, integrated curriculum? What specific things might be happening in the class to students and teacher? Let's attempt to paint a word picture of this type of learning.

To begin, the learning community would focus its adventure on a particular theme, such as "Life in the Year 2010," or "Our Polluted City," or "Building a Sense of Community." The chosen theme would be selected by a team of teachers along with administrators, curriculum specialists, or parents. Another way to choose the theme would be to have the teacher and the students select it after discussing several possibilities. No matter how the guiding theme was derived, the teacher might then help the students define some of the important problems, issues, or concerns associated with that topic. These could take the form of questions to be explored, such as, "What would our school be like in 2010?" or "What are the most serious pollutants in our city air and water?" or "What helps make our group work together as an effective community?"

Individual needs and interests of the students and teacher would be seriously considered along with the nonnegotiable aspects of the curriculum, such as grade level learning outcomes mandated by the school, state, or national groups. Hopefully, the school and government requirements would be flexible and relatively nonrestrictive to enable students to choose much of what they want to learn and how to learn it.

After the real-life theme and questions are outlined, a list of possible outcomes and expectations of the adventure might be brainstormed. If many of the outcomes are mandated, they could be posted as a checklist. As the adventure unfolds, the required outcomes could be checked off when completed.

Perhaps another list could be compiled and posted that represents some of what the students already know about the chosen theme. Yet another approach might be to generate a list of experiences (activities) that the students would like to have, both inside and outside the classroom. This list might look something like the following one, depending upon what theme and related questions were selected:

Futures theme

1. Visit a computer store and find out what educational technology is available now and what is planned for the future.
2. Investigate Disney's Epcot Center in Orlando, Florida (either directly by visiting or indirectly by writing for information), to explore technology and information systems for the future.
3. Create a video showing what might happen in a typical day in this class in the future.

Pollution theme

1. Interview local community members to learn more about air and water pollution concerns.
2. Design a series of scientific tests to determine the type and extent of pollution in the surrounding air and water.
3. Invite speakers from local, state, and/or federal agencies to discuss the status of pollution in your region.

Community-building theme

1. Design a "sense of community" questionnaire to survey the feelings of the students and teacher about the degree of class unity they experience.

2. Invite a school or nearby counselor to visit the class, observe it in action, and comment about the group dynamics and communication patterns.
3. Go to a city council meeting and describe the behaviors displayed by the members that promote and hinder a sense of community.

Once the activities are selected and the planning phase ends temporarily, the students become actively involved in indoor and outdoor experiences. However, merely having the experiences does not always lead to acquiring knowledge. During and after the activities, teachers should pause to lead reflection sessions to help the students clarify the concepts, skills, and attitudes they are gaining and how these can be applied in the future. Questions such as the following can help students reflect on the meaning of experiences:

1. What technology of the future seems to have more negative effects than positive ones?
2. Do we have to use all of the inventions that engineers design? Which would you not use and why?
3. Who is in charge of planning change for the future?
4. Are some pollution risks so minimal that we should learn to live with them?
5. Can you apply what you are learning about this community to other communities you belong to?

When the teacher and students choose to end the study of a particular theme, then some carefully selected performance assessments can be planned to find out what the students know and can do as a result of the adventure. Performance behaviors demonstrated in real-life contexts are meaningful indicators of successful achievement. This type of authentic assessment can supplement or replace written responses on paper-and-pencil tests. When both forms of assessment are used, both the teacher and the students have a better idea of what has really been learned.

In order for these action images or mental pictures to become

realities, several assumptions about teaching and learning have been made. These assumptions or givens are

1. Students have their basic needs for adequate nutrition, health, security, power, love, and fun sufficiently met in order to engage in meaningful learning.
2. Students can identify and participate in learning activities that satisfy their personal needs and interests and, at the same time, satisfy required educational objectives.
3. Student involvement in intellectually challenging, reality-based problems and issues provides them with the necessary structure to learn the required subject matter, or intelligences as defined by Howard Gardner, or both.
4. Teachers do not have to possess all of the required prerequisite knowledge that will eventually emerge from the study of the thematic unit, but prior planning and study of the topic will better prepare them to guide reflection sessions more effectively.
5. Teachers possess the basic facilitating skills in group dynamics and interpersonal communication in order to help the students develop an effective and caring learning community.
6. Teachers have the knowledge and authority to make the day-to-day decisions involved in structuring meaningful learning environments, designing curriculum, and assessing the results of student learning.

If these assumptions are not in effect in a classroom, the implementation of theme-based, student-centered, interdisciplinary teaching and learning will be difficult and most likely ineffective.

Are you ready to explore the following adventures to find one that fits your curriculum plans? Remember, you don't have to use all the ideas. Just pick and choose what makes sense. Enjoy and learn from these experiences.

Outdoor Adventure Theme No. 1

Watching and Talking to People at the Shopping Center

(adapted from Knapp, Swan, Vogl, & Vogl, 1986, pp. 14-15)

Organizing Problems

What can we learn about human behavior by visiting a shopping center? What can be learned about how a shopping center operates?

Background

People behave in different ways because their attitudes and values vary. Psychologists believe that people strive to meet more than their basic physical needs such as food, water, and shelter. They also want to feel a sense of security, belonging, closeness to others, positive self-image, enjoyment, achievement, and knowledge about and control of their surroundings. By observing people engaged in differing activities, students can often determine how these needs are met and what they value. In this adventure, students visit a shopping center to observe human behavior and to interview people. These observations may be made elsewhere, but shopping centers usually offer a variety of people to observe; places to rest, drink, and eat; lavatories; mailing centers; entertainment; and other amenities. Before they go, students should generate a list of what they know about human behavior at shopping centers and what they want to find out. After the visit, other questions are likely to arise. Students may need to make a return visit to answer these additional questions.

Possible Outcomes

1. Students will make inferences about human needs and values from careful observation of people.
2. Students will design data-gathering methods, gather data, and organize and present it to others.
3. Students will discover basic concepts and principles about a

segment of the local economy and discover how a shopping center functions.

Possible Activities

1. Observe the driving and parking habits of customers in the parking lot. Find out the type of vehicles they drive, how they select parking spaces, whether or not they lock their vehicles, or other information. (*social studies, math, psychology, science*)
2. Study the behaviors of shoppers traveling in groups. Find out how long they stay together. Study the behaviors of people who shop alone. Compare and contrast the two kinds of shopping behavior. (*social studies, psychology, science*)
3. Investigate the displays that capture shoppers' attention for the longest time. Find out if there is a positive relationship between the length of time spent at a display and the number of purchases made. (*art, language arts, math*)
4. Study the behavior of people at rest. Find out where they prefer to sit, how long they sit, what they do while they sit, and other related information. (*science, math, social studies*)
5. Ask the shoppers why they came to this place. Survey them to find out what attracted them, how long they plan to stay, what they hoped to find, whether or not purchasing items is important, and other reasons for coming. (*social studies*)
6. Investigate security measures taken by the operators of the shopping center. Find out whether safety is an important issue for shoppers and what they notice about the security system. (*social studies, psychology*)
7. Find out if people stop to look in mirrors and reflecting windows. Investigate how long they stop to look at themselves and what they do while looking. (*psychology*)
8. Study the reactions of people when you face them and smile or make other friendly facial gestures. Record these responses and state general rules about how people react to different gestures. (*psychology*)

9. Make inferences about how people walk and move about at the center. Determine if they seem to move with a purpose or in random ways. Make maps of their movements. Figure out ways of estimating how fast people move. (*physical education, science, math*)
10. Find out which convenience facilities are used the most. Survey telephones, restrooms, drinking fountains, money machines, mailboxes, eating areas, seating, and other amenities. (*social studies, math, science*)
11. Study sound at the center. Survey the use of music and speech to communicate to customers. Find out what sounds are most relaxing and which are most annoying. (*music, language arts*)
12. Talk to the manager and other employees at the center to find out how they view their jobs and what they perceive to be problems and concerns. (*social studies*)
13. Take a survey of employees to determine who works at a shopping center. Consider age, education, gender, race, and other information. (*social studies, math*)

Reflection Questions

1. What did you learn from people by observing them? How could you be sure you were right? How can speaking to people expand what you can learn from them?
2. How could you improve the methods you used to gather information?
3. What new questions and problems about human behavior arose as you were exploring? Did you try to answer these new questions? Why or why not?
4. From your observations of and discussions with people, what did you find out about their attitudes and what they valued? What do you agree with? What do you disagree with? Can you explain the reasons for the areas of agreement and disagreement?

5. How do psychologists and sociologists study people? Could you use some of their methods? Which ones?
6. If you were to begin this study of human behavior at a shopping center again, what would you do differently? What do you still wonder about?
7. What did you learn about how a shopping center works? Did you discover any problem areas that people identified? Do you have any solutions?
8. Are there any services that you might provide to people at the shopping center?
9. What are some of the basic needs and values of the people who use this shopping center? How typical are these people compared to people elsewhere?

Performance Assessments

1. Write and perform a play about human behavior based on what you learned.
2. Write a book for younger children about human behavior or about how a shopping center works.
3. Make a list of recommendations for improving the shopping center operation and share it with the manager or shop owners.
4. Teach a lesson to students from another class about how to gather information about people. Prepare data-gathering guides to help others observe and survey people.
5. Prepare displays or posters from your findings and show them to people at the shopping center and to parents.
6. Write letters to the editor of the local newspaper describing some important issues that you discovered.

Outdoor Adventure Theme No. 2

Community Planning

Organizing Problems

What evidence can we find that the city or town has been planned? What can be done to improve how the community functions?

Background

Some communities employ a planner or elect a governmental body to decide how the area should develop. Some communities are very conscious of planned development and others are not. Some communities zone the land to attempt to control the type of development in different areas. By exploring the community and talking to people, students can begin to understand the importance of advanced planning and how the process works. This community study is intended to raise the awareness level of students and involve them in decision making, problem solving, critical thinking, and other aspects of the democratic process.

Possible Outcomes

1. Students will discover more about how decisions are made that affect the development and operation of the community.
2. Students will have a close interaction with the people responsible for community planning and with those who use the services in the community.
3. Students will become aware of some community problems, how they are solved, and how they might be prevented.
4. Students will have opportunities to suggest and implement changes to improve the community.

Possible Activities

1. Survey the community for evidence of good planning, poor planning, or no planning. Find out who is responsible for managing the physical growth of the area and how this is accomplished. (*social studies*)

2. Station students at various points in the community to make surveys of traffic patterns. Design a plan that will improve the traffic flow. (*math, social studies*)
3. Find out if the community has a zoning plan. List the benefits and problems of zoning. Devise a way to improve the plan. (*social studies*)
4. Attend a city government meeting when the group is discussing a proposed development in the community. Find out as much as possible about the agenda item before going. (*social studies*)
5. Talk to people about their thoughts and feelings related to community development. Find out what they like and dislike about the planning process. (*social studies, language arts*)
6. Find out how communities try to attract certain businesses and industries to the area. Select a desirable business or industry and write a plan to attract it. Consider putting the plan into action. (*social studies, language arts*)
7. Survey the community to locate land (open space) that could be developed in some way. Find out who owns it, the size of each parcel, and what it might be used for in the future. Determine how open land is best used. (*social studies, math*)
8. Find out the source of the community's water supply and how plentiful it is. Determine how this relates to community growth. Measure water consumption over time. (*science, math*)
9. Find out where the solid waste goes and determine how this relates to community growth. Calculate the amount of this waste and compare this figure to published national averages. (*science, math*).

Reflection Questions

1. What beliefs did you discover about beauty, money, decision making, controlling people and things, power to change the future, and preserving open space?

2. Are you satisfied with how the planning decisions are made in the community? If not, what can you do about it?
3. Is the democratic process working in your community? What works and what doesn't?
4. What are some of the effective leadership skills used by individuals and groups in the community?
5. What knowledge is necessary before people can develop a successful community plan?
6. What would your community be like if all development had been carefully planned from the beginning?
7. How do you predict the community will look in 10 years? ... 20 years?

Performance Assessments

1. Create a master plan for community development and use a variety of media to present it to a governmental group.
2. Compile photographs or make a video showing evidence of both good and poor planning in the community.
3. Select a development problem that has not been addressed or remedied and do something to solve it.
4. Make a display that shows some of the modern technology used in community planning.
5. Demonstrate in some way that you are aware of career opportunities available to those involved in community planning.

Outdoor Adventure Theme No. 3

Local Pollution Problems

(adapted from "Pollution Opinions" in Knapp et al.,
1986, pp. 19-20)

Organizing Problems

What is pollution? Where in the community can we find it?
What can we do about it?

Background

People sometimes disagree about what constitutes a pollution problem and how severe it is. Environmental problems are sometimes difficult to identify because people do not view their surroundings in the same ways or value the same things. Sometimes people are undecided about the best way to remedy pollution problems and they argue about the risks and monetary costs involved. Each environmental issue should be discussed thoroughly before the problems can be solved. Some environmental issues relate to air and water quality, how to generate energy, how to use or not use land, how to protect endangered animals and plants, and whether or not humans should hunt animals for sport. There are many other controversial issues related to using natural resources. In this adventure, students will investigate local pollution problems.

Possible Outcomes

1. Students will investigate the pollution of various natural resources to determine if the contaminants create a serious problem.
2. Students will discover what is known about local pollution and what, if anything, should be done about it.
3. Students will suggest ways of resolving some pollution problems and attempt to improve environmental conditions through a service project.

Possible Activities

1. Survey different people in the community to find out what they know and feel about local pollution problems. (*social studies, language arts, science*)
2. Investigate the quality of the air, water, soil, and plants in the community to determine if pollution is present and in what amounts. (*math, science, technology*)
3. Clip pollution articles from the local paper over a period of weeks. Visit the people and places in the news to find out more information. Write letters to the newspaper describing what you discovered about what makes pollution news. (*language arts, social studies, science*)
4. Investigate and make a list of sources of local pollution and evaluate the risk from the most life threatening to the least life threatening. Rank them according to other criteria such as those that affect visual quality, those that cost the most money to correct, or those that would cause public controversy if reduced. Find out if community members agree with your rankings. (*social studies, language arts, math*)
5. Attempt to put a dollar figure on the cost of keeping a natural resource clean. Find out how much people are willing to pay to "clean up" local pollution problems. (*math, social studies*)
6. Map the community and show the locations of pollution. Also show the places, if any, where people can escape certain types of pollution. (*social studies*)
7. Talk to older people to figure out how the pollution problems have changed over time. Present your findings either visually (in graphs), orally, or in written form. (*social studies, music, language arts, math*)

Reflection Questions

1. What are some of the difficulties in defining and measuring pollution?
2. What types of people are most helpful in assisting you in this investigation?
3. Is it difficult to get certain types of information about a local pollution problem? Why do you think this is so?
4. What are the best sources of information about pollution?
5. Is it possible to live in the community and not pollute at all?
6. Who is living the least polluting lifestyle? Who is living the most polluting lifestyle? Should the government control pollution behaviors?
7. What do people in the community value most and least about their lifestyles?
8. Are they willing to make any lifestyle changes? If so, what?

Performance Assessments

1. Conduct a class panel discussion on local pollution problems. Invite people from outside the class to attend.
2. Write and illustrate a book about pollution in the community.
3. Make a video about local pollution. Create narration and music to accompany the visual images.
4. Hold a mock town meeting and have students assume the roles of different people in the community. Discuss local pollution as the main topic.
5. Select a pollution problem that can be improved or solved by the students, and provide a community service by working on it.

Outdoor Adventure Theme No. 4

Homesteading the Land

(adapted from Knapp et al., 1986, pp. 21-24)

Organizing Problem

How could the land in our area support us if we were to settle on it?

Background

Role-playing early settlers in the area can be an effective method of learning history and relating to the people who settled the land. Pioneers needed to survey their properties to find the best locations to build homes, barns, roads, gardens, orchards, wells, and other necessities and conveniences. In this adventure, students will pretend that they are going to homestead a plot of land and will, therefore, need to explore it before living there. Natural and cultural evidence found during the exploration will be recorded and a plan developed for settlement. Any plot of land will serve as a laboratory for learning about some of the decisions necessary for surviving there. A particular point in history can be selected, or the role-play can take place in present time. The purpose is to understand some of the survival factors encountered by people who have wrested a living from the land and to consider what local resources can support them.

Possible Outcomes

1. Students will explore a plot of land as though they intend to settle there. In the process, they will become aware of the natural and cultural history of the bioregion.
2. Students will encounter various problems of settling a plot of land and will devise a plan to overcome these problems.
3. Students will become familiar with some of the tools of the surveyor, mapper, builder, and other skilled workers involved in settling the land.

Possible Activities

1. After exploring an area, create a map of the area to be settled. Find out if any maps are already available. Create maps to show boundaries, rock and soil formations, vegetation, topography, and other natural and cultural features. (*social studies, science, math*)
2. Find out about surveying the land. Investigate and try out some of the tools used by early and modern surveyors. (*social studies, math*)
3. Learn how to read a compass and to use it along with a map to navigate on the land. Select a location to hide a "treasure" and bury it. Give a treasure map to another group and challenge them to find it. (*math, physical education, social studies*)
4. Find and list as many domestic and wild animal signs as possible. Next to the name of each animal, list the possible ways that the animal could contribute to your survival if you were a pioneer. (*science, social studies*)
5. Locate people in the community who have special skills that would help the class survive on the land. Find people who can build a fire without matches, build a cabin, cook over open fires, make rope, weave baskets, dye wool, shape metal for horseshoes and other items, set traps for small animals, identify trees and other edible and medicinal plants, make butter, and perform other needed skills. Invite them to demonstrate their skills. (*social studies, science*)
6. With wooden or metal stakes, mark proposed locations and sizes of various buildings, a well, fencing, a garden, a pasture, an orchard, an outhouse, and other development projects needed to live on the land. (*social studies, math*)
7. Visit a farm and learn why it was laid out in that way. (*social studies, science, math*)

Reflection Questions

1. Which type of map was most difficult to read or make (soil, vegetation, topography, etc.)?
2. Where is the best place to find early and modern surveying and mapping tools?
3. What problems would you encounter if you were really going to live on this piece of land for a year?
4. If you were to select an ideal piece of land on which to settle, what features would you look for?
5. How have new technologies affected the surveying and mapping of the land?
6. Were you successful in finding the location of the buried "treasure"? Were the directions given in words, sketches, or both?
7. What animals and plants are no longer found on this land? When and why did they disappear?
8. Are some people who know certain survival skills difficult to find? Which ones?
9. What did you learn about how and why human settlements are arranged as they are?
10. Where did the term *homestead* originate? Can you homestead today?
11. How large an area does a family of 10 need to support itself?

Performance Assessments

1. Make a diorama of a farmstead, showing the location of all important development.
2. Make a list of all the questions a pioneer might need to ask before settling a piece of land.
3. Write a story about the difficulties pioneers encountered when they homesteaded an area.
4. Read stories about how the pioneers settled the land. Evaluate the stories' accuracy and realism.

Outdoor Adventure Theme No. 5

Starting a Democratic Society

(adapted from Knapp et al., 1986, pp. 25-27)

Organizing Problem

What skills are necessary in order for people to live together in a democratic society?

Background

This adventure has been used successfully with groups of intermediate and junior high school students to increase their understanding and appreciation of a democratic society. It provides them with opportunities to work cooperatively in solving social problems. The best location for this activity is in a park or other natural area, although school grounds may be suitable. Students should work in small groups whenever possible to increase their involvement in solving the problems.

Each group should brainstorm a list of necessary social structures and survival tasks (the teacher may suggest some of these). Students should then work together to accomplish what is needed. The teacher or a team of students can evaluate the groups according to how well they meet each challenge. After a period of time, all the small groups can gather together to reflect verbally on what happened. All social groups usually adopt a name for themselves and their location, establish rules for getting along, select leaders, invent ceremonies to celebrate special events, design a flag or banner, develop an economic system, build shelters and plan for a food supply, and develop a security or protection system. They also operate according to unstated social structures called norms. Students can decide if they want to continue using the social systems of modern times or invent their own for this situation.

Possible Outcomes

1. Students will become aware of some of the social structures needed to establish and maintain a democratic society.

2. Students will appreciate some of the difficulties involved in establishing a new group.
3. Students will work cooperatively to accomplish some of the needed survival tasks.

Possible Activities

1. Imagine that the group will establish a new community in a natural area outside. By exploring the area, develop a list of things that need to be accomplished in order to live together. Consider naming the group or location, writing rules for living and working together (a constitution), inventing celebrations and rituals, developing economic and security systems, and establishing other social structures. (*social studies*)
2. Imagine that the group will meet their survival needs from the surrounding land. Consider making shelters, protecting the community, finding water, making a fire, catching fish, making containers for gathering water and food, weaving mats, dyeing cloth, making weapons or traps, making clothes and headgear, digging pits for food storage, making items to sell or barter, and performing other survival tasks. (*art, science, social studies*)
3. Invent a new language and system of communication without using pencils and paper. (*language arts*)
4. Design the society as you hope it would develop as the population increases. Project how the population might increase over time. (*social studies, math*)
5. Spend a 24-hour period in the new community to see how the social structures you established work and how you could meet basic survival needs. (*social studies, science, language arts, art*)

Reflection Questions

1. What social problems arose that you didn't plan for? How did you solve them?
2. Did the social structures you invented really work? How could they be improved?
3. How did old-fashioned and modern technology help to meet your survival needs? What problems do technologies create?
4. Have you ever thought about not using certain tools and devices even though they made life easier?
5. How successful was your role-playing adventure? Was it difficult to stay within the roles and situations you created? Why?
6. Did any conflicts arise among the society members? How were they resolved?
7. What do you appreciate about living simply, close to the land? What do you appreciate about modern-day life? How can you get the best of "both worlds?"

Performance Assessments

1. Write and perform a play for the community about some of the problems and joys of establishing a new society.
2. After living under the rules of your new society for 24 hours, revise them to show what you learned.
3. Write a new constitution for an ideal society that is better than the old one.
4. Visit a "living history" village and do an inventory of what you did and didn't know before you went.

Outdoor Adventure Theme No. 6

Seeing a City Block

(adapted from Knapp et al., 1986, pp. 47-49)

Organizing Problem

What can we learn from investigating a city block?

Background

We often take familiar surroundings for granted. A guided walk around a city block may bring new awareness and surprises to students. They may discover that they really haven't seen much there before. This adventure will help students apply skills of observation, critical thinking, and recording data. By asking *why*, *how*, *who*, *where*, and *what* questions, students will discover their "familiar" surroundings and, in the process, raise many new questions. Behind each object and event is a fascinating story to be uncovered by the class. As a pretest, ask the students to walk around the block and make a list of their observations. Ask them to repeat this assignment after completing the study. Compare results.

Possible Outcomes

1. Students will observe buildings, streets, drains, sidewalks, utility poles, fire hydrants, signs, and many other local features, and discover their origins, uses, and importance.
2. Students will become aware that they really hadn't *seen* much in their surroundings.
3. Students will raise more questions than they answer by carefully investigating a city block and applying many critical thinking skills.

Possible Activities

1. Make an inventory of the kinds and number of plants growing through pavement cracks and in other areas. (*science, math*)

2. Examine the utility poles along the street to determine their origin, height, diameter, and circumference, how they are used, and other information. (*math, science, social studies*)
3. Observe building exteriors to determine if writing or dates are visible. If so, record these and interpret their meanings. (*language arts, math, social studies*)
4. Make a survey of how the buildings are being used now. Find out how they have been used over the years. (*social studies*)
5. List the names (common and scientific) of the local trees and find out their meanings, uses, and origins. Find the largest of each species (diameter measured at 4.5 feet above ground). (*social studies, language arts, science, math*)
6. Imagine that you were a raindrop falling to the pavement. Trace the drainage patterns by walking where the water would flow. Check your accuracy during or after a rain-storm. Determine the speed of water flow. (*science, math*)
7. Find evidence of the weathering of concrete, metal, wood, paint, and plastic. Determine how exposed surfaces are protected from the elements. (*science*)
8. Locate any writing embedded in asphalt and concrete sidewalks or streets. Interpret the meanings. (*language arts, social studies*)
9. Examine the shrubs and other plants along the street. Identify each one, tell how it got there, and report on how people and other animals benefit from it. (*science, social studies*)
10. Survey the litter along the street and sidewalk and write a poem or story about the people who might have dropped these items. Categorize and count each item and graph the results. (*language arts, social studies, math*)
11. Find something that you know least about and learn as much as you can about it. (*all basic subjects*)

Reflection Questions

1. What discoveries are most surprising? . . . annoying? . . . pleasant? . . . frightening? . . . sad?
2. How could you find out what lies under the pavement?
3. What clues were you able to piece together to learn more about an object? How could you verify your conclusions?
4. Where were the best resources for researching the area's history?
5. Where does water go after it disappears down a drain?
6. Does weathering occur faster in the city or in the country? How could you find out by experimenting? . . . by asking someone? . . . by reading?
7. What animals and plants are best adapted to live along a city block? What features help them to survive?
8. How many new discoveries did you make during this adventure? What do you think you will remember for the longest time? Why do you think you will remember this?

Performance Assessments

1. Without looking at the city block, draw a series of pictures or sketch a map or diagram of the area showing as many things as you can remember. Label each with an explanation of why it is important.
2. Report your discoveries to a community group.
3. Lead a city-block nature walk for younger children or senior citizens, or both.
4. Walk along a different city block in your town and list everything you observe.

Outdoor Adventure Theme No. 7

Fast-Food Fact Finding

Organizing Problem

How do fast-food restaurants impact the quality of community life?

Background

We sometimes ignore the educational potential of the community's businesses. They can often help students learn many useful concepts and skills. Owners, managers, and other employees usually cooperate by supplying needed information about their businesses. In this adventure, the students begin by generating questions to be answered by visiting a fast-food restaurant and by talking to the people there. This type of restaurant has been selected because it is found in most communities and it is usually popular. Other businesses can also be investigated using this model as a guide. This adventure can reveal how businesses can make both positive and negative impacts on the community and how what we value determines our concept of quality.

Possible Outcomes

1. Students will investigate how fast-food restaurants operate.
2. Students will evaluate the benefits and problems associated with fast-food restaurants.
3. Students will develop plans for solving some of the problems created by fast-food restaurants and will recognize and celebrate the restaurants' positive contributions to the community.

Possible Activities

1. Interview the restaurant manager to find out how employees are trained. (*language arts, social studies, science*)
2. Survey the customers to find out why they eat there. (*social studies, language arts*)

3. Investigate the nutritional and health values of different foods and recommend the best food combinations to order. Suggest changes and/or additions to the menu to improve the nutritional and health values of the food and how it is prepared. (*science*)
4. Find out if the restaurant recycles any of the materials used in food preparation and serving. Suggest ways to improve recycling efforts. (*social studies*)
5. Analyze the number and types of throwaway containers and other materials and devise a plan for reducing waste. (*social studies, math*)
6. Survey the area around the restaurant to find out the extent of littering by the restaurant's customers. (*social studies, math*)
7. Trace the origins of the foods served to find out where they came from. (*social studies*)
8. Find out about the policies governing employee behavior. Determine which policies are set at the local level; if the restaurant is part of a chain, determine which policies are set at the regional or national levels. (*social studies*)
9. Determine the volume of business by counting customers, calculating their length of stay, observing and counting or weighing what they order, estimating how much they spend, and gathering other economic information. (*math*)
10. Find out what the restaurant does to educate its customers, provide employment, donate to special events, and make other contributions to the community. (*social studies*)
11. Develop a list of criteria for judging good service; then use it to evaluate the quality of the service. (*social studies*)
12. Develop a plan to alleviate one of the problems created by the restaurant. (*social studies*)
13. Compare and contrast the differences between fast-food restaurants and slower service, "comfort" restaurants. (*science, social studies, math*)

14. Determine how the restaurant attempts to influence its customers to buy certain foods. (*language arts, psychology*)
15. Study the size and layout of the parking and drive-through areas and make recommendations for improving the parking and traffic flow. (*social studies, math*)
16. Find out what precautions are taken to protect the health and safety of employees and customers. (*science, social studies*)

Reflection Questions

1. What factors should be considered before approaching a restaurant's manager or owner to ask for cooperation?
2. What are the pros and cons of having fast-food restaurants in the community?
3. How could you improve the way the information was gathered in this adventure?
4. What other questions arose as you carried out this study?
5. What could you learn by studying other types of businesses?
6. How has this adventure affected the amount of money you spend at this restaurant in the future?
7. How has your attitude toward fast-food restaurants been influenced by the people who work there? . . . your food preferences? . . . the way the food is prepared and served? . . . the design and appearance of the restaurant's interior? . . . other factors?
8. Would you consider working at this restaurant? If so, what job would you want and why?
9. How does this adventure relate to the required school curriculum?
10. What 10 things you learned were most interesting? . . . useful? . . . discouraging? . . . surprising?

Performance Assessments

1. Write a report on what you learned and share it with the restaurant manager. Get his or her feedback on the report.
2. Write and produce a comedy sketch about eating in fast-food restaurants.
3. Revise the food service system in order to save money for the restaurant, speed up service, provide friendlier service, improve sanitation and safety, reduce litter, or achieve other goals.
4. Create a design for your own fast-food restaurant based on what you learned.

Outdoor Adventure Theme No. 8

Scouting the School Grounds

Organizing Problem

How can the school grounds help us answer important questions?

Background

School grounds can help students learn about the immediate environment. The area surrounding the school can also provide hands-on learning opportunities and may enrich the curriculum in many subjects. Students usually welcome a change in scenery, especially when they can apply what they have learned in the classroom. As they explore the school site, students will be surprised at what they discover. Teachers, too, will realize that the area surrounding the school can be a valuable resource for reinforcing concepts, skills, and attitudes connected to the required curriculum. Teachers should know the school grounds just as well as they know the instructional aides available in the classroom (see "Environmental Inventories" in Appendix B).

Possible Outcomes

1. Students will explore the school grounds to discover answers to questions raised by the teacher and themselves.
2. Students will study the school grounds throughout the school year to investigate changes in the immediate environment.
3. Students will increase the learning resources available on the school grounds by doing projects to improve the site.

Possible Activities

1. Make an inventory of the resources on the school grounds and record your findings. (*science, social studies, math*)
2. Find out what was on the property before the school was built and what was added later. (*social studies*)
3. Study the area surrounding the building(s) and list the questions that you wonder about. Later, select the most important and interesting questions for investigation.

4. Paint an outline map of the United States on the pavement play surfaces. Use the map to find states, major lakes and rivers, and other features. Draw the map to scale and record equivalent measurements in the legend. (*social studies, math*)
5. If playground equipment is present, invent activities that will help others learn about math and basic physics (e.g., swings help teach about pendulums; seesaws help teach about levers; slides help to teach about planes and acceleration, merry-go-rounds help teach about centrifugal force). (*math, science*)
6. Survey the site for evidence of wildlife. Estimate how many of each species use the site. Do projects designed to increase the number and kinds of animals (e.g., food plantings, shelters, feeders, watering areas). After a period of time, estimate the number and kinds of animals again to compare changes. (*science, math*)
7. Study the effects of the weather on the school grounds, buildings, soil, and other features. If weathering is a problem in certain places, try to correct the problem. (*science*)
8. Make a rock pile composed of every kind of rock found in the area. Then study how each type of rock was formed, how humans use them, and other interesting facts. (*science*)
9. Design ways to make the school grounds more beautiful, safe, educational, or all three. Then do as many of these projects as you can. (*science, social studies*)
10. Find the highest and lowest points on the site and make a topographic map connecting all points of the same elevation. Obtain a geological survey map to check the accuracy of your map. (*social studies, math*)
11. Study the parking and delivery needs at the school and devise a plan to improve them. (*social studies, math*)

Reflection Questions

1. What new discoveries did you make?

2. Why do most people ignore the familiar things around them? How can we expand their awareness of the familiar?
3. What are the proper channels to follow in obtaining permission to make changes on the school site?
4. Does the school have a committee to help advise on school site projects? How would a committee help and hinder the process?
5. What were some of the most serious problems you found? What are the barriers to solving each one?
6. Who in the community could help find answers to some of your questions?
7. How much money has been spent to improve the educational value of the school grounds compared to the amount spent to equip indoor classrooms for learning?
8. How can vandalism on the school grounds be reduced? Does the definition of vandalism vary with the observer?
9. What local businesses and organizations might be willing to donate money, materials, equipment, or advice to help improve the school site? How should they be approached?
10. How did working on these school site projects affect the sense of community for those who worked together?

Performance Assessments

1. Write a master plan (including maps) showing how you would develop the school site for learning over the next five years.
2. Invite the parents and other community members to the school and explain what you learned and how you improved the school site.
3. Write and illustrate a book showing how the school site has changed throughout history.
4. Form consulting teams of students to advise other schools on how to increase the educational potential of the school grounds. Then send the teams out to visit the schools.

Outdoor Adventure Theme No. 9

Reading the Cemetery Story

Organizing Problem

How is exploring a cemetery like reading a book?

Background

Almost every community has at least one cemetery. They are places to respect and enter with reverence and only with permission. Cemeteries are also places that can be "read" like a book if we know what to look for and how to interpret the symbols. Reading the words, dates, and other engravings on the grave markers is only the beginning. We can also interpret the stones, plants, fences, buildings, and other features. The cemetery "story" deals with more than local history. Students can learn science, language arts, art, math, and other subjects in this adventure.

Possible Outcomes

1. Students will learn how to interpret the story of the cemetery through applying skills such as observing, thinking, questioning, inferring, and predicting.
2. Students will gain respect and appreciation for the value of cemeteries and will learn to care for and protect them.
3. Students will deal with the concept of death and dying through investigating some of the lives of those buried there.

Possible Activities

1. Find out who owns and operates the cemetery and gain permission to investigate it. Make sure your purposes are clear before you begin. (*social studies, language arts*)
2. While at the cemetery, develop a written code of behavior that reflects respect for the people buried there, their families, and the site's environment. (*social studies, language arts, ethics*)

3. Make a survey of the grave markers to determine the family names and their ancestors' places of origin. (Be aware of any students' relatives who are buried there.) Make inferences about the religion of the people. Investigate first names to determine if any patterns exist throughout the years. (*social studies*)
4. Calculate the mean, median, and mode of the life spans of the people buried there. If the cemetery is old enough, draw generalizations about life spans in the 19th century compared to life spans in the 20th century, and compare life spans of men, women, and children. (*math, social studies*)
5. Study the designs and epitaphs engraved on the markers and analyze how they have changed over time. Make rubbings using heavy paper and crayons. (Caution: Develop a method that protects the paper from ripping and the crayon from discoloring the marker.) (*art, social studies*)
6. Calculate the average plot size and determine the capacity of the cemetery to accommodate additional burials. (*math*)
7. Talk to the people responsible for digging the graves, and ask them to tell stories about their experiences. (*language arts*)
8. Study the effects of weathering on different types of grave markers, and predict which ones will last the longest. (*science*)
9. Find evidence of cemetery vandalism, and develop a plan for repairing the damage or preventing future damage. (*social studies*)
10. While sitting separated from others at the cemetery, write stories inspired by the setting. Think about why cemeteries are often the setting for scary horror stories. (*language arts*)
11. Study the types and shapes of the grave markers and relate them to changes over time. (*math, social studies*)
12. Find evidence of, or make inferences about, the causes of death of the people buried there, and then make generalizations about associated changes in medical science. (*social studies*)

13. Make inferences about the economic status and position in the community of those buried there by examining the types and sizes of markers. (*social studies*)
14. Survey the kinds of plants growing in the cemetery to determine if they were planted or grew wild. (*science, social studies*)
15. Observe how families care for the graves and remember the deceased. (*social studies*)
16. Determine if family sizes were larger or smaller at different times in history by surveying the markers. (*math, social studies*)

Reflection Questions

1. What images of cemeteries have been communicated in the media? Which media form influenced you most? How can this prior conditioning affect this adventure?
2. Does talking about death and being where death is evident present a problem for some? What can be done about this?
3. What are the benefits and problems associated with investigating a cemetery and facing the issue of death?
4. Is it possible to separate feelings about death from thoughts about death? How do feelings affect thinking? How does thinking affect feelings?
5. What kinds of cemetery readings are easy? What kinds are difficult? Why is this so?
6. Has the cemetery adventure resulted in any changes in attitudes? ... concepts? ... skills?
7. How could the students help others feel more accepting about investigating a cemetery? ... discussing death?
8. How have some of the world's religions helped people deal with death? What have schools done to help people deal with the issue of death?

Performance Assessments

1. Prepare an oral report or display to communicate to the whole school what the class learned at the cemetery.
2. Write a story about being in the cemetery during the day and at night.
3. Through photographs, videos, or original illustrations, create a display about how to "read" the cemetery story.
4. Visit another cemetery and "read" its story. Analyze how your thinking skills improved.

Outdoor Adventure Theme No. 10

Down the Drain

Organizing Problem

Where does the wastewater go when it enters the drain pipe?

Background

As our society has changed and become modernized, many people feel more distant from the land. Years ago, pioneers grew grains, fruits, and vegetables; dug and pumped water from wells; raised animals for meat; made tools; and did as much as they could for themselves. They were much more self-sufficient then. As industries and businesses became more specialized and spread around the world, we became less aware of basic understandings of food, water, air, energy, and other earth cycles. Not only have we become disconnected from knowing much about the resources we need for survival, we also have become separated from knowing where many of our waste products go. What happens to wastewater as it leaves the school and home is a mystery to many—especially those living in suburban and urban areas. This adventure explores the issue of wastewater disposal in the community.

Possible Outcomes

1. Students will accurately trace the path of water after human use for various purposes.
2. Students will describe what happens to the water after it enters a treatment facility, the soil, or a body of water.
3. The students will explore wastewater disposal issues and attempt to solve problems they identify as important.

Possible Activities

1. Make a survey of all the drains and pipes that allow water to leave the school or students' homes. (*social studies*)
2. Make a survey of all the drains and pipes that allow water to leave areas beyond the school and homes. (*social studies*)

3. Locate people in the community who can explain the patterns of underground pipes and other water drainage channels. Make a map of a portion of this system. If possible, observe workers digging underground to repair broken pipes. (*social studies, science, math*)
4. Trace the wastewater sewers from the school or home to the sewage treatment plant (if it ends up there). Trace the wastewater that does not end up at the treatment plant. (*social studies*)
5. Visit the wastewater treatment plant to learn what happens there. Using diagrams and words, trace the water from its entry point to its exit point. (*art, science*)
6. Find out how the community dealt with wastewater before the treatment plant was built. (*social studies, science*)
7. Find out how the treatment plant has changed over the years. (*social studies, science*)
8. Find out what happens to the solid waste that accumulates at the treatment plant and trace its path after it leaves. (*science*)
9. Find out if the liquid and solid wastes leaving the treatment plant are tested for any contaminants. If so, ask if the students can observe tests being done and learn the results. (*science*)
10. Find out what problems the treatment plant operators face and how people in the community could help solve some of the problems by changing their behaviors. (*social studies, science*)
11. Take a survey in the community to find out if people know how they could help alleviate problems at the treatment plant. (*social studies, science, language arts*)
12. Make plans to help alleviate treatment plant problems in the community and implement them. (*social studies, science*)
13. Interview a plumber to find out what skills are needed and to discover interesting stories about fixing and unplugging drains. (*social studies, science*)

Reflection Questions

1. Who in the community gave the best answers to the questions raised? How were these people found originally?
2. What written materials helped to answer some of the questions? Where did you obtain this information?
3. Which questions were more difficult to answer? Why might this be so?
4. How has plumbing and wastewater treatment changed since early times in your community?
5. How could the students change their personal behaviors to improve wastewater treatment? What difficulties arise in changing the behaviors of others in the community? Is it easier to change your own behavior first?
6. What is the financial cost to the community for returning pollution-free treated water to the environment? Is this possible?
7. What are some of the social costs for returning polluted water to the environment after treating it?
8. What do you know after the adventure that you didn't know before? What do you know how to do now that you didn't know before? What will you actually do with what you learned?

Performance Assessments

1. Write articles for the local paper explaining how the water treatment system operates and what the community members can do to help make it work better.
2. Write and perform a play in which the characters are drops of water passing through drains and traveling to the treatment plant.
3. Develop a large mural for the school hallways showing where wastewater travels, how it is treated, and what can be done to conserve water.
4. Select one of the important wastewater disposal issues and invent a possible way of resolving it.

Outdoor Adventure Theme No. 11

Nature in the City

Organizing Problem

What evidence of nature can we find in the city?

Background

Nature is often defined as everything in the environment that is not human or made by humans. This way of using the word can create problems because it implies that we are separate from nature, which is not true. We are just as dependent upon a healthy environment as are animals, plants, and other living organisms.

Because human population has greatly increased over much of the earth's surface and because we use some types of technology that consume large amounts of materials and energy, we have threatened our own survival and that of other living things. We have also threatened whole living systems (ecosystems, like oceans, lakes, and forests) by polluting them almost beyond their ability to regenerate and support life.

In this adventure, the term *nature* will exclude humans and their activities as much as possible. Students may challenge this definition and engage in critical thinking and discussion. Distinguishing between what is nature and what is not can be a valuable exercise.

Very little of the natural world has not been influenced by humans in some way. Even those living in the suburbs, cities, and other populated areas are still closely connected to nature. In fact, humans attempt to preserve nature in the city in many ways. For example, city dwellers plant flowers in containers, sculpt animal and plant forms on buildings, use nature scenes on billboards to sell products, and name streets for plants, animals, and other natural objects. This adventure enables students to find evidence of nature in the city and to think about its meaning.

Possible Outcomes

1. Students will become more aware of nature in populated areas, even those dominated by humans and their creations.

2. Students will realize and appreciate that humans are closely connected to nature and that this relationship can be observed in many ways.
3. Students will have opportunities to increase the evidence of nature in the city through various projects.

Possible Activities

1. Ask students to explore the area around the school and make a list of the components of nature they find. Compile a list of definitions from the evidence found and compare them to the definitions found in an unabridged dictionary. (*language arts, science*)
2. Survey the wider community to find various examples of nature in the city. Look for plants, wildlife, rocks, soil, water, and other evidence. (*science*)
3. Survey the community to find examples of how humans have preserved and reproduced images of nature in the city. Look for nature street names, plant and wildlife sculptures, designs, photographs, paintings, and other clues that people are still closely connected to nature. (*social studies, art, science*)
4. Identify plants and animals that are especially well suited to city survival and explain their survival. Consider organisms such as dandelions, ginkgo trees, tree of heaven, cockroaches, rats, pigeons, and other city dwellers. (*science*)
5. Interview community members to learn how they feel about preserving natural areas in the city. Ask them how they use these areas and how they benefit from them. (*social studies, art, language arts*)
6. Based on direct observation, sketch, paint, compose songs and music, and write stories and poems about nature in the city. (*art, language arts, music*)
7. Locate photographs from different periods of the city's history; compare them to recent photographs of the same places taken by the students. Draw conclusions about how

nature has changed over the years. (*social studies, science, art*)

8. Through discussions with the students, decide how they can increase the evidence of nature in the city. Design and carry out projects. (*social studies, science*)
9. Use natural materials found in the city to create art and crafts to sell to raise funds for beautifying the city. (*art, math, science*)
10. Go to art museums and galleries to trace how humans have depicted nature through the centuries. (*art, social studies*)
11. Go to a radio station that plays classical music and ask them to play musical compositions inspired by nature. (*music*)

Reflection Questions

1. Is *nature* a word having several meanings or just one meaning? Is this true for other words, too?
2. Do people usually use the word *nature* as though everyone shares the same meaning? What problems does this cause?
3. Is it difficult or easy to eliminate evidence of nature from the city?
4. Are humans better adapted for city living, suburban living, or country living? Why do you think so? Can you prove that you are right?
5. Where did you find the best sources of information in doing each nature activity? Which source was the most helpful—people, written material, direct observation, videos, computers, or others?
6. Can humans ever completely separate themselves from nature? How did this distinction between nature and humans come about?
7. What are the various benefits to humans of increasing the evidence of nature in the city? What are the benefits to other animals, plants, and ecosystems?
8. When should nature be destroyed for humans to use it?

9. When should nature be preserved for its own benefit?
10. What are environmental ethics? Do you have an environmental ethic? If not, how can you get one?

Performance Assessments

1. Create displays about nature found in the city and invite the community to view them.
2. Take small groups of people on tours of natural areas in the city and explain what you learned in an interesting way.
3. Design a master plan for beautifying the city and present it to local governmental officials. Ask for their feedback after the presentation.
4. Write a children's book about nature in the city and read it to a group of younger children.

Outdoor Adventure Theme No. 12

Designing and Constructing a Nature Trail

Organizing Problem

How can a nature trail be built and used to learn a variety of topics?

Background

Nature trails exist in many local, state, and national parks, as well as natural areas throughout the world. They are usually designed to interpret or explain various ecosystems such as forests, prairies, deserts, tundras, aquatic areas, glaciers, and volcanic flows. Trails can also focus on ecosystem components and processes such as plants, animals, rocks and soil, weathering, water and drainage patterns, temperature, and other forces that change the land. They can tell each story separately or show how these organisms and forces relate to each other and interact—the ecology of the area.

Trails can also be designed to reveal the ways in which humans have used the place. Historical trails can interpret rock art, early Native or pioneer cultures, architecture, arts and crafts, and a variety of other human activities.

The main purpose of a nature trail is to tell the story of what can be found at the site, both now and in the past. But which one of these many stories should be told? How do designers of nature and human trails decide what to interpret? What is the best way to communicate the message once the topic is decided?

This adventure involves planning, constructing, and using a nature trail to learn about the area. The project can be accomplished on a limited basis in only a few short class periods, or it can be more elaborate and take several weeks to complete. The teacher and students can decide how deeply to get involved and how much time to spend on this adventure.

Possible Outcomes

1. Students will make many decisions and develop new skills

and concepts in planning and building a nature trail in the community.

2. Students will learn about the natural and cultural history of the area in the past and present.
3. Students will observe others using the completed trail and carry out research studies to answer certain questions.

Possible Activities

1. Visit other nature trails in the area to study how they are designed. Based on reflection sessions after the visits, students should construct a list of the strengths and weaknesses of these trails. (*all subjects*)
2. Select several possible locations to build a new trail. Develop a list of general criteria for selecting the best place to build it, and then walk the areas to evaluate them. Based on these evaluations, choose a site. (*language arts, social studies*)
3. Make an inventory of the plants, animals and animal evidence, soil, rocks, signs of human use, and other natural and cultural resources. (See "Environmental Inventories" in Appendix B.) (*science and social studies*)
4. Obtain or create a map of the area and design several possible trail layouts. Consider possible vandalism, slope of the land, rare or endangered habitats, trail width and length, specific areas to be interpreted, beginning and ending places, resting places, shape (linear, circular, figure 8, etc.), and other factors. Select the best design and build the trail. (*science, math, art, physical education, language arts*)
5. Decide how the trail will be interpreted—using signs, audiotapes, or guide booklets at each marked station along the way. (*social studies*)
6. Do a cost analysis on the project. Develop at least three different budgets, depending upon the amount of available money. (*math*)
7. Brainstorm different ways to raise money and solicit donations of time and materials for the project. Select the best

ones and carry them out. Afterwards, thank the people who helped by writing letters and inviting them to the ribbon-cutting ceremony. (*language arts, math*)

8. Brainstorm different topics or themes to interpret along the trail. Consider plant uses, wildlife evidence, inspirational poetry or musical compositions, geology, fitness exercises, math in nature, effects of weather, human evidence, ecology concepts, and other categories. Invite students to choose their favorites and work in small interest groups. (*all subjects*)
9. Decide if the interpretive text will consist of words, artwork, or a combination. Decide if the written text will take the form of factual statements, questions, or a combination. (*language arts, art*)
10. Depending upon the method of interpretation selected (signs, audiotapes, or booklets), begin the writing and artistic process. Even if audiotapes are used, the information should first be in writing. Encourage group editing and critiquing of each other's material. Suggest doing several drafts of the material. (*language arts*)
11. Prepare the booklets, tapes, or signs and make them available for use. Create a ribbon-cutting ceremony and invite key people in the school and community to attend. (*language arts*)
12. Design experiments to test the effectiveness of the interpretive material. Consider the following questions and develop others:
 - a. How much time do people spend at each station?
 - b. Which station helped them learn the most?
 - c. Which form of interpretation (booklet, tape, or sign) was most effective in teaching a concept?
 - d. What topic was chosen most to study (if several topics were available for study)? (*science, social studies*)
13. Conduct a guided walk along the trail, with the students serving as the interpretive naturalists who lead others. Have

them orally explain the material without reading it. (*all subjects*)

14. Keep a written and photographic record of each stage of development of the project and create a book describing the event. (*art, language arts*)

Reflection Questions

1. Who in the community could serve as advisors and resource people on the different phases of this project?
2. What books and videos were most useful as reference materials?
3. Who will maintain the trail this year and in the coming years?
4. If you were to build another nature trail, what would you do differently?
5. What did you learn that you didn't know or couldn't do before?
6. What new student talents and interests did you discover?
7. What did you learn about designing and doing experiments using human subjects? What new questions arose afterwards?
8. How have you improved in your ability to evaluate nature trails?
9. What school subjects did you study while doing this project? Are there some learnings that are difficult to categorize by subject? Which?

Performance Assessments

1. Design a new nature trail using all you have learned from this adventure.
2. Serve on consultant teams and advise other grade levels, or the same grade level at another school, about how to build a nature trail.
3. Make an instructional video showing others how to design and construct a nature trail.
4. Write a book about possible nature trail explorations in your area.

More Organizing Problems to Investigate

1. How does the weather affect human behavior and the surrounding environment?
2. What messages are communicated through outdoor signs and billboards and how are they presented?
3. What organisms live on and under nearby water surfaces?
4. How are hatchery fish raised to stock local ponds, lakes, and streams?
5. Do we have any big trees in the community that may be of record size?
6. How can different types of architecture show the ages of buildings and the values of the architect?
7. During springtime, when do flowers bloom and migrating animals return?
8. What types of fences do people erect and why do they erect them?
9. From what parts of the world do various foods in the grocery store come?
10. What changes in the community can be observed during the course of the school year along a local bus or train route?
11. How does the community change at night?
12. What types of individual and group games do people play to entertain themselves?
13. How do archaeologists investigate an area to learn about what might have happened there?
14. How have people used plantings around local homes and parks over a period of time?
15. How have people used local plants for crafts, dyes, decoration, medicines, and other purposes throughout history?
16. Who are the heroes and heroines in the community who have helped improve the quality of the environment?
17. How can we cooperate with a local museum in order to learn more each time we visit?

APPENDIX A

A BRIEF HISTORY OF OUTDOOR EDUCATION AND
EXPERIENTIAL LEARNING

It is in fact nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant, aside from stimulation, stands mainly in need of freedom; without this it goes to wrack and ruin without fail.

Albert Einstein (in Leeper [Ed.], 1967, p.1)

Einstein was not the first to suggest better ways of teaching. For more than 60 years, outdoor educators have urged others to move students beyond the classroom.

In an article appearing in *The Educational Forum* in May 1943, Lloyd B. Sharp stated that camping education (the early name for resident outdoor education) had a simple thesis: "that which ought and can best be taught inside the schoolrooms should there be taught, and that which can best be learned through experience dealing directly with native materials and life situations outside the school should there be learned" (pp. 363-364). As early as 1935, Sharp recognized that schools needed improvement. He wrote: "The school has been too much insulated from life as it goes on outside of school. There has been too much abstract material unrelated to the life of the students" (Sharp, 1935, p. 6).

The origin of outdoor education was a response to the dissatisfaction with less effective ways of teaching, which Paulo Freire called the *banking model*. In this model, the teacher first deposits information into students' heads. Then students "bank" this information until called upon to prove that the knowledge was deposited by "withdrawing" it (Clinchy, 1995, pp. 383-384).

Another way to view traditional schooling based on behaviorist theory (characterized by teachers who control, shape, prompt, and reinforce student learning) has been described by James Coleman. He labeled this kind of teaching as the *information-assimilation model*, consisting of students passively receiving symbolic information, organizing this information into a principle, inferring a possible applica-

tion from this general principle, and eventually applying the principle in a nonclassroom situation (Conrad & Hedin, 1991, p. 744).

A third way to characterize conventional teaching and learning is what David Perkins called the *chocolate box model*. In this approach, teachers attempt to place isolated chocolates of diverse flavors (discipline knowledge) into the expanding chocolate box of a student's mind (Perkins, 1991, p. 7).

Until recently, outdoor education concepts and principles were practiced by individual teachers if their school administration and community permitted this progressive philosophy. Very few schools adopted outdoor education programs on a systemwide basis. For many, outdoor education provides a welcome alternative to the *banking*, *information-assimilation*, or *chocolate box models* of traditional schooling.

In a dissertation, Martin Rogers (1956, pp. 290-294) listed a total of 49 principles of outdoor education. Particularly relevant to modern school reform efforts are the following:

Outdoor experiences should be first-hand, real-life experiences which are purposeful and meaningful, rather than staged or imaginary.

Learning is reinforced as more senses are involved in the learning process.

Cooperation and companionship are stressed rather than competition.

Outdoor experiences should be planned democratically and conducted in a democratic atmosphere for effective learning.

There should be shared purposing, planning, and action by pupils, teachers, administrators, and the public.

The adaptable or appropriate part of the curriculum should be transferred outdoors.

Outdoor experiences should be pleasant as well as educative, since people learn best in a pleasant situation.

Outdoor education experiences should serve as an integrative agent for the various curricular areas and subject matters, as well as for education and the realities of life.

A desirable teacher-pupil ratio for outdoor education experiences ranges from 1:8 and 1:12.

The school schedule must have flexibility to allow for outdoor experiences.

These principles are just as useful today as they were nearly 40 years ago. Outdoor education pedagogy is resurfacing in some school systems as a way to improve learning. The following programs illustrate that experiential learning beyond the classroom is contributing to school reform.

The Microsociety School

Richmond outlined a school plan in his 1973 book, *The Micro-Society School: A Real World in Miniature*. His idea was that schools should become small versions of the larger society (microsocieties) and be cooperatively designed and operated mainly by students. Recently, this microsociety model has been implemented in Lowell and Pepperell, Massachusetts; and in Yonkers, Newburgh, and New York, New York. In these programs, school experiences are not organized around the conventional disciplines, as most schools are today. They are organized around curricular strands such as publishing, economy, citizenship, or technology. What is taught and learned is determined by how the larger society functions. The dynamics of the surrounding community are reflected in the curriculum design (Clinchy, 1995, pp. 403-404).

Foxfire

Another example of how outdoor education methods are becoming accepted in schools to meet academic and social goals is the Foxfire approach. Developed more than 28 years ago by Eliot Wigginton, a high school English teacher in Georgia, the Foxfire approach has spread throughout the United States and to other parts of the world. Wigginton's ninth and tenth graders wrote and produced the quarterly *Foxfire Magazine* based on the stories they discovered in the local communities. Later, the articles were incorporated into a 10-volume, Foxfire book series published by Doubleday. Eleven principles, or Foxfire Core Practices, guide this instructional approach, several of which are especially relevant to school reform:

All work must flow from student desire and concerns.

The work is characterized by student action.

The work emphasizes peer teaching and teamwork.

The work must be clearly connected to the real world outside the classroom.

Students must take the time to reflect upon experiences.

(Wigginton, 1986)

The Foxfire approach has been adapted in all grades of two elementary schools in Asheville (NC) and Yonkers (NY), and in many other elementary and secondary classrooms across the nation. Currently, there are 14 Foxfire networks in 13 U.S. states.

Walkabout

In 1974, Maurice Gibbons published an article, "Walkabout: Searching for the Right Passage from Childhood and School." This article stimulated the development of Walkabout programs at all levels of education during the next 20 years in North America. The basic idea was "to challenge students to challenge themselves to the best performance they can design in several areas: adventure, creative expression, logical inquiry, practical application, and service" (Gibbons, 1990, p. xv). Also known as Challenge Education, this student-centered approach to learning capitalizes on the power of direct experience both inside and outside the classroom. Other criteria include challenges that extend the capacities of students as fully as possible, challenges that students choose for themselves, demonstrations of achievement that include self-awareness, and celebrations of accomplishments that help students' transition from the school to life afterwards (Gibbons, 1990, pp. 6-7). The Walkabout model has been implemented at all educational levels from elementary school to college in the following places: Cheyenne (WY), Yorktown Heights (NY), Evergreen (CO), Greensboro (NC), Indianapolis (IN), and Worthington (OH) (Gibbons, 1990, pp. 119-142).

Expeditionary Learning

Another current educational reform effort influenced by some of the principles of outdoor education is Expeditionary Learning Outward Bound. This program is an outgrowth of a grant received by Outward Bound in 1992 from the New American Schools Development Corporation (NASDC). Expeditionary Learning schools are guided by ten design principles drawn from the ideas of Kurt Hahn, Eleanor Duckworth, and Paul Ylvisaker.

As articulated by Harvard dean emeritus Paul Ylvisaker: 'Values must be clear and the value of values clearly demonstrable; there is no learning without emotion and challenge; it must be done with intimacy and caring; the collective and the individual can be brought together; there must be a fair assurance of success.' Harvard professor Eleanor Duckworth calls attention to the spirit of infectious intellectual excitement and inquiry; and [Outward Bound founder] Kurt Hahn's work and writings insist on our final guiding principles: the importance of solitude and reflection; and the need to develop community and social vision [Expeditionary Learning, 1992, p. 3]. (Sergiovanni, 1994, p. 89)

Expeditionary Learning and outdoor education are rooted in the same tradition of progressive education. They both incorporate project-based learning extending beyond the classroom. According to Rugen and Hartl, "the conscious use of fieldwork is perhaps the most visible and radically different dimension of learning expeditions" (1995, p. 7). The organizing center of the learning unit is the theme. The open-ended theme defines the territory and generates many questions that are answered by engaging in activities.

In 1993 Expeditionary Learning Schools opened in Denver (CO), New York (NY), Dubuque (IA), Portland (ME), Boston (MA), Baltimore (MD), Decatur (GA), and San Antonio (TX) (Rugen & Hartl, 1995, p. vii).

Problem-Based Learning

Beginning in 1988, the Illinois Mathematics and Science Academy in Aurora, Illinois, instituted a problem-based learning approach in the curriculum. Problem-based learning gives students opportunities to work on realistic, ill-structured problems similar to those faced by professionals. In some selected courses, the curriculum is organized around problem investigation rather than traditional subject matter. The purpose of the approach is to help students become apprentices who solve real-life problems. According to Stepien, Gallagher, and Workman, "information is gathered from materials in the school's library and from mentors in the surrounding community" (1993, p. 346).

In another related project using problems to guide learning, science professors at the College of William & Mary created eight highly motivating, problem-based science units. The units were used successfully with second through seventh graders (Stepien et al., 1993, pp. 355-356).

Summary

All of these current programs illustrate that outdoor education and other experiential classroom methods are becoming more accepted as means to achieve modern school reform. Although some critics would still label these approaches as *experimental*, a growing body of research evidence reveals that effective and efficient learning results. By placing students in rich learning environments beyond the classroom, educators can improve schools by increasing learning. The time has arrived to step outside together to explore the community and surrounding areas.

APPENDIX B

ENVIRONMENTAL INVENTORIES

Most teachers are familiar with the teaching aids in their classrooms and inside the school building. When they move outside the school, their awareness of instructional aids sometimes decreases. Inventories are one way to learn more about the available resources for curriculum planning. If teachers know the location of an ant nest on the school grounds, they are more likely to include this observation during a lesson on social insects. If they can trace the electric lines from the classroom to the transformer outside, they will be more likely to include this observation in their electricity lesson plans. Teachers need not know all of the learning resources outside the school, but knowing several will serve as a start for year-round outdoor adventures.

Inventories can be useful tools for investigating the community, too. After defining the potential learning areas, such as city parks or school grounds, an inventory can be filled out for each site. Take the inventory to each area and explore it. As new resources are discovered, teachers can take notes of related learning activities, concepts, questions to be answered, and places and people to visit for further information. Involve the students in the inventory process and they will become more aware of their surroundings. Enjoy exploring and discovering the world outside the school.

The inventory on pages 84-86 can be used by making enlarged copies (130-140%), or it can serve as a guide to develop your own inventory.

Environmental Inventory

Directions

Fill in the blanks and circle the appropriate words that apply. Make notes on other observations, questions, and related information.

Inventoried by: _____ Date: _____

Location: _____ State/province: _____

Town/City: _____ County: _____

Latitude: _____ Longitude: _____

Site size and legal description of boundaries: _____

Bordering property owners: _____

Natural resources: _____

Water areas (including marshes, ponds, lakes, streams [permanent or intermittent], drainage ditches, springs, other): _____

Tree species: _____

Shrub species: _____

Ground cover: _____

Orchard (type), Forest plantation (type), Field (type), Crop (type): _____

Terrain: _____

Benchmarks: _____

Elevation(s): _____

Location(s): _____

Maximum and minimum elevations: _____

Landforms (flood plain, valley, dune, ravine, sink hole, ridge, rolling hills, other): _____

Geology: _____

Rock and mineral types: _____

Features (rock outcrops, fossils, folding, glacial evidence, ripple marks, faults, bedding planes, gravel pits, other): _____

Soil type(s) and pH ranges: _____

Erosion (describe types): _____

Soil Profile(s) (attach a sketch): _____

Animal evidence: _____

Homes: _____

Tracks: _____

Pathways: _____

Food remains (droppings, pellets, skeletons, other): _____

Plant damage: _____

Plants: _____

Poisonous: _____

Edible: _____

Medicinal: _____

Arts/Crafts: _____

Wildlife food source: _____

Decorative: _____

Built environment: _____

Buildings (school, house, apartment, barn, shed, factory, garage, store, other): _____

Utilities (power lines, telephone lines, water lines, hydrants, sewage lines, septic lines and tank, gas lines and tank, other): _____

Human evidence (building foundations, fences, cistern, wells, machinery, surveying markers, dumps, hunting blinds, tree stumps, grazed area, culverts, storm sewers, flagpoles, conservation [managed woodlot, terracing, contouring, plowing], other): _____

Transportation (road, trail, bridge, railroad, other): _____

Scenic areas: _____

Historical markers: _____

Structures: _____

Construction materials (wood, concrete block, brick, metal, natural stone, other): _____

Exterior covering (paint, tile, stucco, shingle, aluminum siding, other): _____

Size: _____

Estimated age: _____

Accessories (drain pipes, gutters, air conditioners, lighting, lightning rods, weather vanes, fire escapes, shutters, meters [gas, water, electricity], cornerstones, windows, doors, awnings, vents, chimneys, other): _____

Evidence of weathering: _____

Ground surface (concrete, asphalt, gravel, soil, lawn, other): _____

Use of space: _____

Parking areas (%): _____

Play areas (%): _____

Other: _____

Recreational equipment: _____

Problem areas: _____

Safety hazards: _____

Vandal damage: _____

Litter: _____

Area to be improved: _____

Other: _____

Miscellaneous (fire damage, incinerator, historical artifacts, posts, bearing trees, other): _____

APPENDIX C

CHILDREN'S LITERATURE SPRINGBOARDS TO OUTDOOR ADVENTURES

- Asch, F. (1994). *The earth and I*. San Diego, CA: Gulliver Books.
- Baker, J. (1987). *Where the forest meets the sea*. New York: Greenwillow Books.
- Bandes, H. (1993). *Sleepy river*. New York: Philomel Books.
- Baylor, B. (1994). *The table where rich people sit*. New York: Scribner's.
- Baylor, B. (1986). *I'm in charge of celebrations*. New York: Scribner's.
- Baylor, B. (1986). *The best town in the world*. New York: Scribner, 1983. Reprint, New York: Aladdin Books.
- Baylor, B. (1984). *If you are a hunter of fossils*. New York: Scribner, 1980. Reprint, New York: Atheneum.
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- Baylor, B. (1977). *Guess who my favorite person is*. New York: Scribner.
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APPENDIX D

SELECTED READINGS IN COMMUNITY ADVENTURES AND INTERDISCIPLINARY LEARNING

Integrated Curriculum

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APPENDIX E

ANNOTATED BIBLIOGRAPHY OF BOOKS ON STUDENT-CENTERED, OUTDOOR LEARNING

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How we can create our own celebrations from observing natural events throughout the year.
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Guidelines for understanding and practicing the principle of constructivism in schools.
- Caine, R. N., & Caine, G. (1994). *Making connections: Teaching and the human brain*. Menlo Park, CA: Addison-Wesley.
How to use the facts and theories of human brain functioning to improve teaching and learning in schools.
- Carson, R. (1984). *The sense of wonder*. New York: Harper & Row, 1956. Reprinted New York: Perennial Library.
Rachel Carson offers advice on how to help young people develop a sense of wonder about the natural world.
- Cajete, G. (1994). *Look to the mountain: An ecology of indigenous education*. Durango, CO: Kivaki Press.
How indigenous people view teaching, learning, and the earth.
- Cousins, E., & Rodgers, M. (Eds.). (1995). *Fieldwork: An expeditionary learning Outward Bound reader*. Dubuque, IA: Kendall/Hunt Publishing Co.
A collection of readings that helps to guide educational theory and practice in reforming schools by following ten design principles.
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The nature of learning and teaching to achieve societal goals and reform schools.

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How the Walkabout Program evolved as a way to reform schools and develop self-directed learners.
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A look at inappropriate technology and how we can learn to survive on earth by following indigenous philosophies.
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How indigenous cultures view nature and live in harmony with ecosystems.
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How we can educate people to live in more compatible ways with the earth's ecosystems.
- Orr, D. W. (1992). *Ecological literacy: Education and the transition to a postmodern world*. Albany: State University of New York Press.
How education can better serve humans as they search for sustainable ways to live on earth.
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The importance of building human communities and some ways to accomplish this important goal.
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- honoring the earth*. San Francisco: HarperSanFrancisco.
A collection of inspirational readings about the earth for use in creating celebrations and rituals.
- Rogers, C. R. (1983). *Freedom to learn for the 80's*. Columbus, OH: C. E. Merrill.
How teachers can facilitate a climate of trust and participatory modes of decision making leading to the joy of learning.
- Rogers, C. R. (1980). *A way of being*. Boston: Houghton Mifflin.
An intimate look at how Carl Rogers evolved his person-centered views of people and how he thought they should be treated in educational settings.
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A bridge between the psychological and ecological worlds that attempts to show the linkage between the planet and person.
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The theory and practice of building learning communities in schools.
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A look at the role of outdoor exploration and play in developing a child's connection to special places.
- Suzuki, D., & Knudtson, P. (1992). *Wisdom of the elders: Honoring sacred visions of nature*. New York: Bantam Books.
Examination of indigenous cultures around the world and the lessons we can learn from them.
- Watts, M. T. (1975). *Reading the landscape of America (revised and expanded ed.)*. New York: Macmillan.
Helpful in reading the "language" of nature and culture as we explore the outdoors to learn about ecology.
- Wigginton, E. (1985). *Sometimes a shining moment: The Foxfire experience*. Garden City, NY: Anchor Press/Doubleday.
How an English teacher changed his teaching style from a subject-driven approach to a more student-centered approach.

APPENDIX F

GUIDELINES FOR CREATING STUDENT-CENTERED LEARNING COMMUNITIES¹

Introduction

A democratic classroom can result from the combination of a complex set of instructional elements. In this type of student-centered culture, all members of the learning community make choices in a climate that encourages risk-taking, problem posing and solving, and cooperating. The following topics and related guidelines represent a reexamination of how this type of learning community is formed.

Teacher Role

The teacher's roles are facilitator, guide, model, and scholar. As facilitator, the teacher shares power and helps students accept and exercise their own power responsibly. The teacher recognizes the potential negative consequences of wielding sole authority in decision making. As guide, the teacher structures learning environments and meaningful experiences and points to possible learning resources. As model, the teacher engages in the activities that he or she expects of students and shares the successes as well as the problems encountered. As scholar, the teacher engages in active, ongoing research in order to inform subsequent teaching practices.

Student Role

The students' roles are active learners, decision makers, and sharers of responsibility and power. The students establish appropriate

¹The original document from which these ideas were adapted was developed by a group of college-level instructors funded by a grant from the Andrew W. Mellon Foundation at the Foxfire Teacher Outreach Center in Mountain City, Georgia, on July 16-20, 1993. They were Lynne Raiser, Lynne Schwab, Nancy Rigby, Lib D'Zamco, Gwen Diehn, Mary Ellen Jacobs, Andrea Mandel, Cynthia McDermott, and Clifford Knapp. Their challenge was to reexamine Foxfire's eleven core practices and develop new guidelines for creating student-centered learning communities. This is what they accomplished.

expectations for growth and self-fulfillment; develop questions as the basis for pursuing knowledge; reflect, assess, and evaluate experiences; and share knowledge, expertise, and life experiences to help others learn.

Curriculum

An emergent, problem- or issue-centered, and project-oriented curriculum evolves from the experiences and interests of the members of the learning community. This dynamic process invites individuals to reframe, reconstruct, and reexamine the required curriculum.

Learning grounded in experience encourages individuals and the group to create meaning for themselves and to value the process of learning as well as the product. Ultimately, the evolving curriculum fosters a deeper understanding of diversity, enhances ethical ways of being together, and creates a spirit of continually renewed hopefulness and possibility.

Instruction

Authentic and effective instruction results from a collaboration among members of the learning community as they select methods for exploring the curriculum. Each individual in the group plays a significant role in developing instructional processes and in reaching educational outcomes.

Classroom Culture

The classroom culture is a purposefully constructed learning environment that includes collaboration, choice, consensus decision making, power sharing, successful conflict resolution, inclusiveness, empathy, and safety. Group-centered norms and ceremonies promote a climate leading to the ultimate goals of ecosystem sustainability, human intimacy and caring, and world peace.

Role of the Surrounding Community

Just as the classroom and school are legitimate learning communities, the larger community surrounding the school is a potential classroom. Each of these entities interacts with the others to form a network of instructional resources.

The larger community offers opportunities for partnerships in educative experiences, as well as provides an audience for presenta-

tions of the students' accomplishments. These partnerships link academic, social, and service learning.

Reflection, Assessment, and Evaluation

As the project work of the learning community moves through the stages of vision development, planning, and implementation, three ongoing processes are critical: reflection, assessment, and evaluation.

Reflection is the process of expanding the personal meanings of shared experiences through structured group interaction and individual contemplation. These activities are designed to determine the nature and extent of student learning and the process of acquiring knowledge. Possessing knowledge is more than simply receiving it and giving it back to the teacher upon command. It includes relating information to what is already known and applying it to new situations in everyday life.

Reflection involves *stepping away* from the experience into a position of observation and judgment to establish new perspectives and questions. The resulting insights can help establish future goals and ways of reaching them. Reflection moves learning into a spiral of deeper understanding and connects *knowing* with *doing*.

Assessment is the process of gathering evidence that learning has occurred using a variety of student performance tasks such as portfolios, demonstrations, experiments, projects, or paper-and-pencil tests.

Evaluation is the process of making judgments about the quality of student performance compared to established criteria, or the performances of other students using the same assessment measures, or both.

Continuous and honest reflection, assessment, and evaluation are crucial elements throughout the learning process. All experiences have the potential to be growth enhancing, including the so-called "mistakes." While avoiding an emphasis on reaching perfection, members of the learning community are encouraged to change in positive directions. They are urged to improve the quality of their work by devising and monitoring their own developmental plans for learning.

Summary

The goal of education is to achieve a state of harmony between the learner and the knowledge to be acquired. When this is accomplished, the ultimate result is the joy of learning and the motivation to continue. This goal may be referred to as *Harmony's Ultimate Motivation* or

HUM. Teachers and students alike can achieve this state of HUM as they learn together in student-centered communities.

The implementation of these guidelines develops individual capacities to experience a need-fulfilling sense of satisfaction. This occurs when the guidelines are connected to instructional content and process, and the students and teachers celebrate their curiosity, imagination, aesthetic experiences, and caring behavior toward one another.

APPENDIX G

ORGANIZATIONS AND PROGRAMS

Association for Experiential Education

2885 Aurora Avenue #28
Boulder, CO 80303-2252
303-440-8844

Consortium for Problem-Based Learning

Northern Illinois University
Center for Governmental Studies
DeKalb, IL 60115
815-753-0926
FAX 815-753-2305

Cooperative Learning Network (ASCD)

Harlan Rimmerman
N. Kansas City Schools
2000 N.E. 46th St.
Kansas City, MO 64116
816-453-5050

Earth Force

1501 Wilson Boulevard
Arlington, VA 22209
703-243-7400

Expeditionary Learning Outward Bound

122 Mount Auburn Street
Cambridge, MA 02138
617-576-1260
FAX 617-576-1340

Global Lab Project

TERC
2067 Massachusetts Ave.
Cambridge, MA 02140
617-547-0430
FAX 617-349-3535

Global Rivers Environmental Education Network (GREEN)

721 East Huron St.
Ann Arbor, MI 48104
313-761-8142
FAX 313-761-4951

Ground Truth Studies Project

Aspen Global Change Institute
100 East Francis
Aspen, CO 81611
303-925-7376

Institute for Democracy in Education

119 McCracken Hall
Ohio University
Athens, OH 45701-2979
614-593-4531

Interdisciplinary Curriculum Network (ASCD)

Benjamin P. Eberole
Penn State - Harrisburg
W-357 Olmstead Building
777 W. Harrisburg Pike
Middletown, PA 17057-4898
717-948-6205
FAX 717-948-6008

**International Association for
the Study of Cooperation in
Education**

Box 1582
Santa Cruz, CA 95061-1582
408-426-7926

Micro-Society Inc.

53 North Mascher Street
Philadelphia, PA 19106-2224
FAX 215-922-3303

**National Society for Intern-
ships and Experiential
Education**

3509 Haworth Drive
Suite 207
Raleigh, NC 27609
919-787-3263

**New American Schools
Development Corporation
(NASDC)**

1000 Wilson Blvd., Suite 2710
Arlington, VA 22209

**Teaching for Multiple
Intelligences Network
(ASCD)**

David G. Lazear
729 W. Waveland, Ste. G
Chicago, IL 60613
312-525-6650

The Foxfire Fund, Inc.

P. O. Box 541
Mountain City, GA 30562-0541
706-746-5829
FAX 706-746-5829

The GLOBE Program

744 Jackson Place
Washington, DC 20503
202-395-7600

**The Rivers Curriculum
Project Southern Illinois
University**

Box 2222
Edwardsville, IL 62026-2222
618-692-3788
FAX 618-692-3359

APPENDIX H

FIFTEEN WAYS TO STUDY A PLACE WITHOUT A GUIDE

Jarl Streng and Cliff Knapp

Sometimes, when you go on a field trip with students, no guide is available to help you interpret what is there. If this is the case, encourage individuals or small groups to do some of the following activities when visiting a museum, factory, water treatment plant, or other place of interest beyond the classroom:

1. Play the roles of people from various occupations such as a geologist, forester, zoologist, botanist, ecologist, archaeologist, anthropologist, poet, painter, photographer, sculptor, mathematician, psychologist, circus performer, or truck driver. View the place from their perspectives and share what you experience with others.

Also, by using your imagination and creativity, take nonhuman roles such as a visitor from another planet, animal, plant, wind, rock, rain, snow, or the sun.

2. Play the roles of people with various disabilities (for example, those who cannot see, hear, or walk) and try to imagine how they would experience this place. Have a partner pretend that he or she has one or more of these disabilities and then guide your partner around the place.
3. Select at least three objects or events found at the place and create a song, story, poem, dance, or dramatic presentation using some or all of them.
4. On a piece of paper, place the names of some of the objects you observed in the proper place on a time line, from the oldest to the most recent.
5. Pretend that you are living during various historical periods and write a diary of how you might feel and think. Play the role of that person and share some of your feelings and thoughts with others.

6. Find an object that you think no one knows much about. After giving the rest of the group a chance to guess how it might be used, act out how you think it was used.
7. Find the names of objects that begin with each of the letters of the alphabet or find objects that are clustered in groups of 2, 3, 4, 5, etc., and list them.
8. Make a list of questions that might help others learn more about the objects and events you are experiencing. Then share the list of questions so that others can learn from them.
9. Make pencil sketches of objects to help you observe them more closely. Also, try sketching objects without looking at the piece of paper in order to focus on the details of shape and texture.
10. Pretend that you are in charge of educating people who visit this place. List the most important things you want them to know in three sentences or less and share them with others.
11. If you visit a museum, design a better way of displaying each object so that people will understand how it is used and why it is important.
12. Identify some related hands-on activities that could be done to increase what people learn about the place. For example, at a paper factory, visitors could make some paper using simple methods.
13. Using a camera (35 mm, Polaroid, or video), take pictures of the place so that others can visually experience the visit during your presentation.
14. Make a list of the five most interesting objects you find and explain why they interest you. Do more research on them when you return home.
15. With a partner, describe what comes into your awareness for several minutes at various locations. Then have your partner do the same thing for you.

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ABOUT THE AUTHOR

Clifford E. Knapp is a professor of Outdoor Teacher Education at Northern Illinois University's Lorado Taft Field Campus. He enjoys teaching and learning about the history and philosophy of outdoor and environmental education, environmental ethics and values education, nature arts and crafts, and other outdoor-oriented topics. He has a special interest in experiential learning, indigenous cultures, community building, and the art and science of reflection. Over a 35-year career, he has taught at all levels of education using interdisciplinary, student-centered approaches focused on and in the natural world.

If you look just beyond
the classroom, there is much
students can learn in their
everyday environment.

For example,

What can we learn about
human behavior by visiting
a shopping center?

How do fast-food restaurants
impact the quality of
community life?

How is exploring a cemetery
like reading a book?

What evidence of nature
can we find in the city?

For students with inquiring minds, each of these questions is the basis of an adventure. For teachers the questions can be springboards for teaching science, math, social studies, language arts, and more. Organized around these themes and eight others, Clifford E. Knapp has designed outdoor adventures. To help teachers turn these adventures into meaningful interdisciplinary learning experiences, Knapp has included organizing problems, background information, possible outcomes, a multitude of activities (labeled with the academic subjects to be learned), reflection questions, and performance assessments. The activities—over 200 of them—are geared for students in grades four through nine, but could be adapted easily for lower or higher grade levels.

But really, Knapp would prefer that you and your students invented your own adventures. That's why he includes guidance on how to plan outdoor education adventures that will keep you and your students interested for years. Knapp also describes how this type of interdisciplinary learning relates to historic and current education practice and reform.

Dr. Clifford E. Knapp is a professor of outdoor teacher education at Northern Illinois University. Over a 35-year career, he has taught at all levels of education using interdisciplinary, student-centered approaches focused on and in the natural world.



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